SELECTION IN JAMAICA

A. Deans Peggs, M.Sc., M.Ed., F.L.S., F.R.S.S.

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SELECTION IN JAMAICA

A. Deans Peggs

Volume II: 'ERU' TESTS

Intelligence Test 1	ERU T1	1257
Intelligence Test 2	ERU T2	0019
Intelligence Test 3	ERU T3	1751
Supplementary Test 1	ERU S1	1259
Supplementary Test 2	ERU S2	0019
Supplementary Test 3	ERU S3	1751
English Test 1	ERU E1	1358
English Test 2	ERU E2	0019
English Test 3	ERU E3	1751
Arithmetic Test 1	ERU A1	1256
Arithmetic Test 2	ERU A2	0019
Arithmetic Test 3	ERU A3	1751
Marking Key for Intelligence	T1	121
Marking Key for Supplementary	S1	121
Marking Key for English	E1	121
Marking Key for Arithmetic	A1	121
11+ Non-verbal Test	ERU NV	156
Absurdities	Ab	156
Always Has	AH	156
Analogies	Ag	156
Classification	Cl	156
Completion	Cp	156
Doesn't Belong	DB	156
Opposites	Op	156
Pairs	Pr	156
Adult Verbal Test	ERU AV	850
Adult Non-verbal Test	ERU AN	0951

As these tests are currently being used by Education Authorities in the British Caribbean, it would be appreciated if they were to be regarded as being

STRICTLY CONFIDENTIAL

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CONTENTS

Index of Figures

Index of Illustrations from 'THE TORCH'

Above Illustrations by Courtesy of 'THE TORCH'

Note: 'a' means facing e.g. page 11a faces page 11
'b' means Following e.g. page 24b follows page 24

Abstract

This research was conducted under the auspices of the Colonial Social Science Research Council over a period of five years in Edinburgh and Jamaica. It is viewed against a background of poverty and abundance of food, bad health and delectable climate, an awakening desire for culture and varied but inadequate education, which can barely keep pace with the population increase. It began with the construction of tests of intelligence and attainment for use at 11 to 12+ for transfer to secondary (grammar) schools. Non-verbal tests for the same age-group and two short adult tests were also constructed, a new non-verbal test item being devised incidentally. The task was made difficult by the corrupt form of English spoken, the extreme range of ability and attainment, and irregular attendance at school. Detailed instructions were prepared so that tests may be administered in future by departmental field officers. 700 scholarships are in force at 26 secondary schools at any one time; competition is keen, there being well over a thousand candidates in the Local Scholarship Examination yearly. The greater number of candidates in 1948 came from those parishes where literacy and school enrolment were highest. There was an excess of girls and of children from urban areas. Full advantage is not taken of the opportunities to enter the examination. A geographical analysis suggests that migration adversely affects certain parishes and that ability and attainments are unevenly distributed throughout the Island. Sex and school differences reveal strong evidence of concentrated coaching of elementary school pupils, giving them unexpected superiority, in some respects, over secondary school pupils. Factor analysis confirms this by revealing a "coaching" factor having a total variance greater than v and second only to g. A follow-up experiment was begun and an interim analysis shows that the Scholarship candidates perform as well as new entrants to secondary schools, a minority of whom take the Scholarship Examination.

PART I. INTRODUCTION

Chapter 1. Education Research Unit, Jamaica

The small unit pursuing research in Jamaica under Colonial Development and Welfare Psychological Research Scheme R 93c was, for the sake of brevity, commonly referred to as the 'Education Research Unit'. The research was sponsored by the Colonial Social Science Research Council and the Head Master of the Government High School, Nassau, Bahamas, A. Deans Peggs, M.Sc.,M.Ed.,F.L.S.,F.R.S.S., was seconded to conduct the work. For convenience, he was referred to as the Education Research Officer. It was originally intended that, following a year's training in the United Kingdom, two years should be spent pursuing research in the field; he arrived in Jamaica in November, 1947.

2. The training period, which was extended to five Terms, was spent at Moray House, Edinburgh University, under Professor Sir Godfrey Thomson, D.C.L., D.Sc., Ph.D., Bell Professor of Education of the University and Director of Studies of the Training College. This period was an excellent preparation and foundation for the subsequent fieldwork, chief emphasis being on the several aspects of tests and testing procedures. As well as covering all types of tests of intelligence, attainment, practical and spatial abilities, etc. and their administration, the training included the construction and standardization of tests by the methods currently in use at Moray House. There was also the use of tests in the investigation of problems in educational research together with the statistical methods applied to the analysis of the results of such experiments. Under the guidance of Professor James Drever, M.A., of the University Department of Psychology, attention was given to general and educational psychology and the assessment of personality.

Through/

Through the co-operation of the Edinburgh City Education Department, some insight was gained into the functions and methods of child guidance work in the clinic conducted by Miss Anne G. Patterson, M.A., B.Ed. and also in the 'adjustment classes' organized by the clinic in the schools. The part played by educational psychology in the welfare of young delinquents was followed from the clinic through the Juvenile Courts and thence to Approved Schools as exemplified by the Classifying School at Aycliffe in Durham County. Finally, in addition to practical work in these several aspects, augmented by visits to schools and other educational institutions, opportunity for original research on a colonial problem was afforded. (see Appendix 1, page 135.) ~~by analysis of the Curti data from Grand Cayman described fully in chapter 14.~~

3. Initially, a free grant of £6920 was made in favour of the Government of Jamaica for the research. It was found necessary, chiefly because of the extended period both of training and research, to revise the original estimate in 1949 to a total of £7970; and, in 1950, sundry additional sums were provided in a further grant of £300.

4. The Director of Education was responsible to the Jamaica Government for the administration of the scheme. At the outset, the Director was the Honourable B. H. Easter, B.A., C.M.G., M.L.C., upon whose retirement in 1949 the then Education Planning Officer, H.Houghton, Esq., M.A., became Director. Under both Directors, the Education Department and its officers, administrative and accounting as well as field officers directly engaged in the work of inspecting and teaching, afforded the Research Officer the most valuable consultation and advice and the fullest measure of active co-operation in facilitating and in doing the work associated with the research. Educational research does not come within the normal duties of a colonial Education Department and the demands made by such activity, especially by research of limited/

limited duration where time is an all-important factor, being additional to the usual responsibilities of an under-staffed department, are apt to place considerable strain upon it. Prompt action by the accounting section spared many delays, especially in acquiring equipment, that would have otherwise seriously impeded ~~to~~ the research. On the experimental side, the ready and extensive assistance given by the Department left nothing to be desired. Perhaps the most outstanding instance of this co-operation was the willingness to place the services of a senior officer, the whole field staff of eighteen inspectors and the heads and teachers of fifty schools, involving more than 10,000 pupils, at the disposal of the Unit at the very shortest notice.

5. The Department afforded financial assistance as well. While there was no vote in the Education Estimates for research, it was possible so to apply the vote for the Local Scholarship Examination as to afford considerable assistance to the Research Unit which, in return, had undertaken to construct tests for, and assist generally in the organization and conduct of, this examination and in the subsequent marking of scripts and preparation of results. For instance, the Unit was relieved of the heavy expense of setting up type and printing the first thousand copies of 'ERU' Tests which were paid for by the Department for use in the Scholarship Examination. Copies of the same tests were thus made available for the Unit's use in research at the considerably lower 'run-on' rate. In the same way, other phases of the research were made to serve the purpose of the Department and thus relieved the Unit, for example, of the travelling expenses of the inspectors who administered tests throughout the Island. Then, too, for short periods during the construction of tests the Department was able to provide the Unit with an additional assistant.

6./

6. Many departments, not directly concerned with education, provided help and facilities in several ways. Outstanding among these was the Public Works Department whose promptness in giving such assistance as was sought proved embarrassing upon occasion. This Department helped in ways too numerous and varied to recount; by far its most valuable contribution was the conveyance of children from several small neighbouring country schools within a radius of 5-7 miles to one focal point where it was possible to accomplish in a few days work that would otherwise have taken more than a month. The Central ó Bureau of Statistics contributed chiefly in loaning equipment for use with Powers' punched cards. For several weeks before the Unit closed, one of the Department's two sorting-counting machines was placed exclusively at the disposal of the Unit in spite of the pressure of routine work for other departments. Not only did the Registrar General make all his records freely available to the Research Officer, but he also undertook the considerable labour of more than a hundred searches, this representing a tremendous saving of the Unit's time and labour. The Vital Statistics Adviser afforded helpful consultation and, chiefly in his other capacity of supervising the West Indies Census of 1946, also supplied essential information about several colonies that is not otherwise easily accessible. It is not possible to name those other departments who not only supplied information but, in many instances, undertook small phases of the work and thus made possible a great deal of research that would not Have been possible in the time available.

7. The willingness of Education Departments outside of Jamaica to undertake the full responsibility for conducting an experiment in their respective territories provided means of extendingg the research through a considerable/

considerable area of the Caribbean. This entailed much labour for the staffs in those colonies and also a great deal of study of printed instructions which had to take the place of the personal contact, demonstration and discussion that was possible in Jamaica. The faithfulness with which these instructions were carried out testifies to the enthusiasm with which those colonies participated as well as to their careful preparation for the experiment.

8. It was originally intended that the Research Officer should spend about one year in Jamaica, and the second year in Barbados, paying as much attention to neighbouring colonies from both these centres as cirsumstances allowed. However, there was an initial period occupied by finding headquarters, acquiring equipment and appointing staff during which the research proper made little progress. Had the Unit transferred its operations to Barbados at the end of a year, a further period would have been lost through the same causes while much work would have been left in an unsatisfactory state of incompleteness in Jamaica. Then, too, the advantage of the Jamaica inspectors' experience in administering tests could not have been fully exploited; this would also have applied to the training that had been given to the Unit's local assistants. As the Research Officer's arrival in Jamaica was delayed by four months, only eight months remained to carry out research and this was chiefly occupied by the construction of tests. After consideration of all these circumstances, it was decided that transferring the Unit to Barbados would not have been justified. As some compensation for this change of plans, the so-called 'West Indies Survey' was organized at the beginning of 1950 in which other colonies were invited to participate. Following correspondence giving a detailed description of the experiment, a brief visit to the

Windward/

Windward and Leeward Islands and Barbados was made by air in October of 1949 to confirm arrangements and clear up several difficulties that had arisen and which could not easily be surmounted by correspondence by uncertain mails.

9. Soon after the Research Officer arrived in Jamaica, the Trustees of Mico Training College undertook, at some expense, to restore a small derelict building in the college grounds and to instal water, sewage and electricity. Within a month it was ready for occupation, the Principal having meanwhile placed a room in the College at the Research Officer's disposal. This building served admirably as headquarters for just over a year. During this time, the task of organizing the Unit and then of constructing tests and arranging for their use in the Local Scholarship Examination made location of the Unit's headquarters in Kingston eminently desirable. But, at the end of that year, the increasing amount of experimentation involving testing in schools made a more central location in the Island desirable; and, the accommodation problem having become acute on account of continued expansion, the College could well use the extra building. Accordingly, the Unit's headquarters were moved to Mandeville for the remainder of the time in Jamaica. This afforded the further advantage that, in the cooler climate at an elevation of 2000 feet, the efficiency of the Staff was greatly increased and they willingly worked longer hours with less fatigue than would have been possible in the dusty, humid heat of Kingston.

10. The following assistants were appointed:

Miss M.C.Johnston, B.A., from the staff of The High School, Nassau, Bahamas, was Senior Assistant from March, 1948, to November, 1949.

Mr. S.A.Morgan, Head Master of the Swift-Purscell School at Clermont, St. Mary, was Research Assistant from April to December/

December, 1948.

Miss I.S.Crawford, seconded from the Department of Agriculture, was Secretarial Assistantfrom January, 1948, to March, 1949.

The following Junior Assistants were employed for varying periods: Miss W.E.Minto, H.J.McLaughlin, R.W.Chung, G.G.Allen, Miss J.E.McNab, R. Owen, Miss E.St.G.Dunn and R.G.Taylor. All these Junior Assistants were employed straight from the upper Forms of Secondary Schools on the recommendation of their Head Masters/Mistresses. The real interest they evinced in the research, the speed with which they became acquainted with the somewhat unusual tasks they had to perform and, above all, the accuracy which they acquired left no doubt as to the success of this method of recruitment and reflected considerable credit on the Schools whence they came.

Several temporary assistants were employed as needed for the marking of scripts.

11. In addition to the paid assistants, much work was done for the Unit by Mrs.R.W.Meredith, B.Sc., B.A., Senior Female Supervisor of the Jamaica Department and, for a shorter period, by A.S.Frankson, Esq., M.A., School Supervisor of the Department of Education in British Honduras. Assistance in the administration of tests was given by Education Officers, Inspectors, Supervisors, Heads and Teachers in Jamaica and elsewhere far too numerous to mention.

12. The Education Research Unit was finally closed, and the Research Officer left Jamaica, in March,1950. There followed a few months at Moray House, Edinburgh, during which the data collected in the field were analysed and the task of compiling a report was begun. The Research Scheme officially ended in August, 1950, but the Research Officer continued his work, during four months' leave, until the end of the year. He returned to the Bahamas in January,1951, to resume duty as Head Master in Nassau.

Chapter 2. Background of the Research

13. The programme of research that will be described later was not entirely preconceived but was fashioned largely by circumstances. It began with an attempt to satisfy a long-standing need of the Education Department in the course of which certain questions and difficulties arose which suggested further experiments. Not all of these could be investigated, the chief limiting factor being the shortage of time available, and a number of problems, many of them urgent, and for some of which preparations had been begun, had to be set aside on this score. Others were precluded because of the local conditions under which the research was carried out. For this reason, and to facilitate a proper appreciation of the work done and the results obtained, some description seems necessary of the background of the research.

14. Although only 148 miles long (E- W) and from 22 to 52 miles wide, Jamaica is yet the largest of the British West Indian Islands (see Figure 4; page 87) Its estimated population of 1,362,600 at the end of 1948 comprised no less than 45% of the total population of over three millions in all British Caribbean territories, including the mainland colonies of British Guiana and British Honduras. It was chiefly for this reason that this colony was chosen as locale for the research.

15. Being only 18° North of the Equator, it experiences a tropical climate, tempered by the moderating influence of the ocean but aggravated, on occasion, by severe hurricanes. The last of these, in 1944, completely devastated the north and north-east with " little "loss of life but great destruction of houses and cultivation." Within a few hours, 60 schools were completely destroyed (1/10th. of the total) and about 200 more damaged, many of them severely; three years later the Director could report that only 16 of the former had been rebuilt while the repair of the others was similarly delayed for lack of funds. This present century has seen an average of one hurricane every six or seven years. Earthquakes are even more disastrous, but mercifully very infrequent; the last of these, in 1907, "caused great loss of life as well/

"well as immense destruction of property."

16. The island is extremely mountainous, with a maximum height of 7400 feet in Blue Mountain Peak. These mountains are perhaps the most important factor influencing most aspects of the Jamaican scene. They dominate the topography, impede communication and diversify the climate. In the east they separate an area of unbelievably luxuriant vegetation and agriculture to the north, enjoying as much as 200 in. of rain per year, from a scrubby, barren near-wilderness on the south with less than 30 in. of rain. From the dusty heat of Kingston, which is at sea-level and in the driest belt, one can see the military hill-station of Newcastle, no more than 10 miles distant as the crow flies, but at an elevetion of 4000 ft., relaxing in an atmosphere as much as 15° cooler. Only about one-fifth of the island's surface is flat and this includes ~~miro~~ marl and swamps. Rivers, especially to the South, may be no more than rocky depressions which can be transformed in an hour into raging torrents, disappearing again with equally astonishing suddenness. Otherwise, they are short, (the longest is 44 miles) precipitous and virtually useless for ~~navigation~~ navigation, though potential sources of power. Agriculture in the hills is apt to be a precarious business as landslides are frequent during torrential rain. Roads may be blocked for several weeks from the same cause and travelling on boulder-strewn roads carved out of almost perpendicular precipices can be alarming and no less dangerous. Into the mountains retreated the Maroons - ~~these were the~~ slaves left behind by the Spaniards joined later by runaways from English masters. To this day, their descendants, while they own allegiance to the King, enjoy a certain degree of local autonomy, have their own leaders and live their own life largely cut off from the rest of the population.

17. The economy is predominantly agricultural. The 1943 Census revealed that about half of the surface area of the island was cultivated, this being four-fifths of the total area of cultivable land while the rural population amounted to five-sixths of the whole. Consequently /

Consequently, 54% of all gainfully occupied men and 25% of all gainfully occupied women were ~~engaged~~ engaged in agriculture. This includes, at one extreme, the owners and managers of large estates and, at the other extreme, the farm labourer and the peasant operator of one acre or less. 333 farms over 1000 acres in extent together comprised more than half the cultivable land and yet ~~against~~ these were 66,173 persons operating farms, whether as owner or tenant, ~~there were~~ but only 107,038 agricultural labourers. Moreover, these figures do not include 146,515 small plots of land, of less than one acre, cultivated, for the most part, in addition to some other occupation. Although this tradition of independent peasant enterprise may be commendable, yet it has unfortunate and tremendous repercussions on school attendance, for child labour is utilized in the fields. For every seven wage-earners the census reported one " unpaid family helper ". ~~and~~ 6-7% of these were of school age and these figures probably under-estimate the extent of this problem.

18. Poverty is widespread both in Kingston and in the country. The evil in Kingston is due chiefly to an uncontrolled, and seemingly uncontrollable, migration of far more people than there is employment for in the city. Elsewhere the cause lies chiefly in low earnings and landlessness. 62% of all male wage-earners ~~enjoyed~~ engaged in agriculture earned less than 10/- during one particular week at the end of 1942; less than ~~60%~~ 6% earned more than £1. Less than 6% of female agricultural wage-earners earned more than 10/-. Moreover, of all agricultural wage-earners, only 28% of the men and 18% of the women had more than 40 weeks' employment during the year 1942; while 27% of the men and 38% of the women worked less than 6 months. On the other hand, except in Kingston, subsistence crops can be fairly easily raised (if there is the land available) and an almost infinite variety of fruits abounds with no apparent need for cultivation. But this tends to an unbalanced diet, inevitably of carbohydrates in the main, for such low earnings can procure very little beef at a controlled price of 1/2d per lb., though goat is cheaper. A strong movement is underway to provide children a mid-day/

School Canteen in St. Catherine

A CHALLENGING EXPERIMENT

midday
~~mid-day~~ meal at school. In Kingston, a philanthropic organization, aided by Government, provides meals at low cost or, where necessary, free. In rural areas, assistance is given to schools for the erection of kitchens and for the growing of vegetables so that hot ~~mid-day~~ midday meals are available to children, free in necessitious cases, in one-third of the Islands schools.

19. In the main, the climate is kind and makes few demands in the way of clothing and shelter except in the higher and wetter parts; but poverty is such that a large proportion of the population lives under the most appalling housing conditions. These are ameliorated to a considerable extent in the country where the houses are not crowded together and an abundance of fresh air circulates, at least around the house, if not inside on account of its being tightly sealed by night. In the towns, but especially in Kingston, there are localities where the crowded conditions of squalor are indescribable. 21% of all dwellings have walls of wattle or thatch, a larger number have thatched roofs while 9% have only earth floors. Only 17% were reported as being in good condition while 61% were infested with termites to some extent. About one-third of all dwellings have floor area of less than 100 sq. ft. and accommodate nearly a quarter of the population; while four-fifths of the people live in houses of less than 300 square feet, and one-fifth of these houses each accommodate from 6 to 15 or more human beings. Only 15% of all houses are bigger than 300 sq. ft.; 49% comprise only one room and accommodate 36% of the population; 19% have no water supply within half a mile; and 19% have no toilet facilities.

20. Under these circumstances of poverty, bad feeding and bad housing, and in spite of the clement weather (counteracted in many parts by mosquito-breeding swamps), the general state of health of the mass of the people leaves much/

The Health Centre, School Clinic, Kingston.

much to be desired. In face of the sheer magnitude of the problem of disease, the pitifully small medical force can make but little impression though, where effort can be concentrated, considerable success is achieved. Other than the size of the problem, the chief enemy is ignorance ; in the first stages of illness the people are as likely to turn to bush tea and other herbal and native remedies, not excluding obeah, as they are to visit the doctor even where he is reasonably accessible. Not until these have patently failed (and probably aggravated the complaint) will many seek out a doctor whose chief difficulty then is often, not to diagnose the ailment, but to elicit an intelligible explanation of the symptoms. Thereafter, unless he prescribes a bottle of some medicine or other, whatever the complaint, he is doubtful as to how much co-operation his patient will give him in effecting treatment. ~~(As much fact on nature and extent of deseases as possible.)~~

21. Malnutrition, tuberculosis, venereal diseases, yaws, hookworm, malaria (especially in certain areas) and intestinal parasites represent a chronic drain on the health of the people and of their efficiency as workers. Typhoid fever and "vomiting sickness" occurs regularly and sometimes attain epidemic proportions. Vomiting sickness is a seasonal complaint ~~xxxxxxxxxx~~ occurring in winter and resulting in many deaths. Its nature and treatment reguire considerable research which available resources cannot provide; it is popularly ascribed to the eating of a variety of foods such as unripe yams and ackees. In 1948, there were notified 1258 cases of pulmonary tuberculosis and 1038 cases of typhoid, butthe number of communicable diseases reported "cannot be accepted as denoting the true incidence of any disease. "Fear of ostracism and persecution by uncharitable neighbours "still/

"still act as deterrents to seeking medical attention "for communicable diseases, pulmonary tuberculosis in "particular". (Report of Medical Services, 1948.) The four venereal diseases clinics treated 8987 new cases of syphilis, while 1652 in-patients received treatment for syphilis at the public hospitals. Among 12,688 new cases of gonorrhea, reported at the clinics alone, the number of men ammunted to nearly 2 % of the total male population. The incidence of malnutrition is reflected in the fact that, of the total number of women admitted to the public maternity hospital in 1948, a little more than 25 % showed signs of malnutrition.

22. That home environment of children is depressingly bad may be well suspected from the previous paragraphs. But, added to these other contributory causes, promiscuity is rife; to what precise extent cannot be known but may be inferred from a few statistics. It was reported in the 1943 census that, of all girls in the Island aged 15-19, 13 % were mothers; of these 73 % were single while a further 20 % were common-law wives.* One-third of all mothers had neither legal nor common-law husbands. Of all children who had been born to all mothers, only 71 % had survived. Of those who had survived, 43 % were the children of mothers who were still unmarried at the time of the census. Of the remainder it must not be supposed that the man whom the mother married was the father of all her children; it is by no means uncommon for "families" to be of very mixed parentage. In 1947, 69 % of all children born were illegitimate; 16 % were born to girls aged 12-19 while over 2 % were born to girls aged 16 or less. Of all girls aged 15-19, 10 % bore children that year; in 90 % of these births, neither was the girl married nor was the father's name registered. To the extent that the efforts of the teachers to educate/

* A state of cohabitation of indefinite duration.

educate must be reinforced by the home, it would appear that the teacher may be losing ground rather than gaining it, since far too many children have no home in the usually accepted sense of that term.

23. The biggest enemy of all who seek to solve Jamaica's social and economic problems is the phenomenal increase in population. In one century to 1943, the population of the Island increased from less than 400,000 to more than 1,200,000. In the 22 years up to 1943 it increased by 44 %; in 5 years since 1943 there has been a further increase of more than 8% to over 1,300,000. The problem in Kingston is even more acute. The population of the city increased by 73% in the 22 years up to 1943 while the corresponding increase in St. Andrew, the urban area of which Kingston is now spilling over, was no less than 135%. This disproportionate increase, especially in St. Andrew, is still taking place. Concerning racial origin, 78% of the people are black, 18% are coloured, 2% East Indian, and 1% each are white and Chinese. There are also small numbers of Jews, Syrians and other races, chiefly European. By and large, the blacks, coloureds and East Indians supply the bulk of the agricultural workers and labouring and semi-skilled classes generally. The proportion of East Indians engaged in agriculture is greater than in the case of either blacks or coloureds, the disparity being greater among women. Black and coloured women find their way to domestic service to a greater extent than East Indian women. The whites and European races comprise the owners and managers of large estates and businesses and supply the professions and public service. The Chinese have a virtual monopoly of the grocery trade while Syrians also engage chiefly in the retail trade. But these are broad generalizations and blacks and coloureds are to be found in the highest positions including Civil Service.

24. Before/

24. Before turning to an examination of the educational system, an insight into the standard of literacy and education among the population as a whole may be gained from the 1943 census report. Taking, as illiterate, those people who could neither read nor write and admitting, as literate, people who could read only, the census supplies the following percentage estimates of illiteracy:

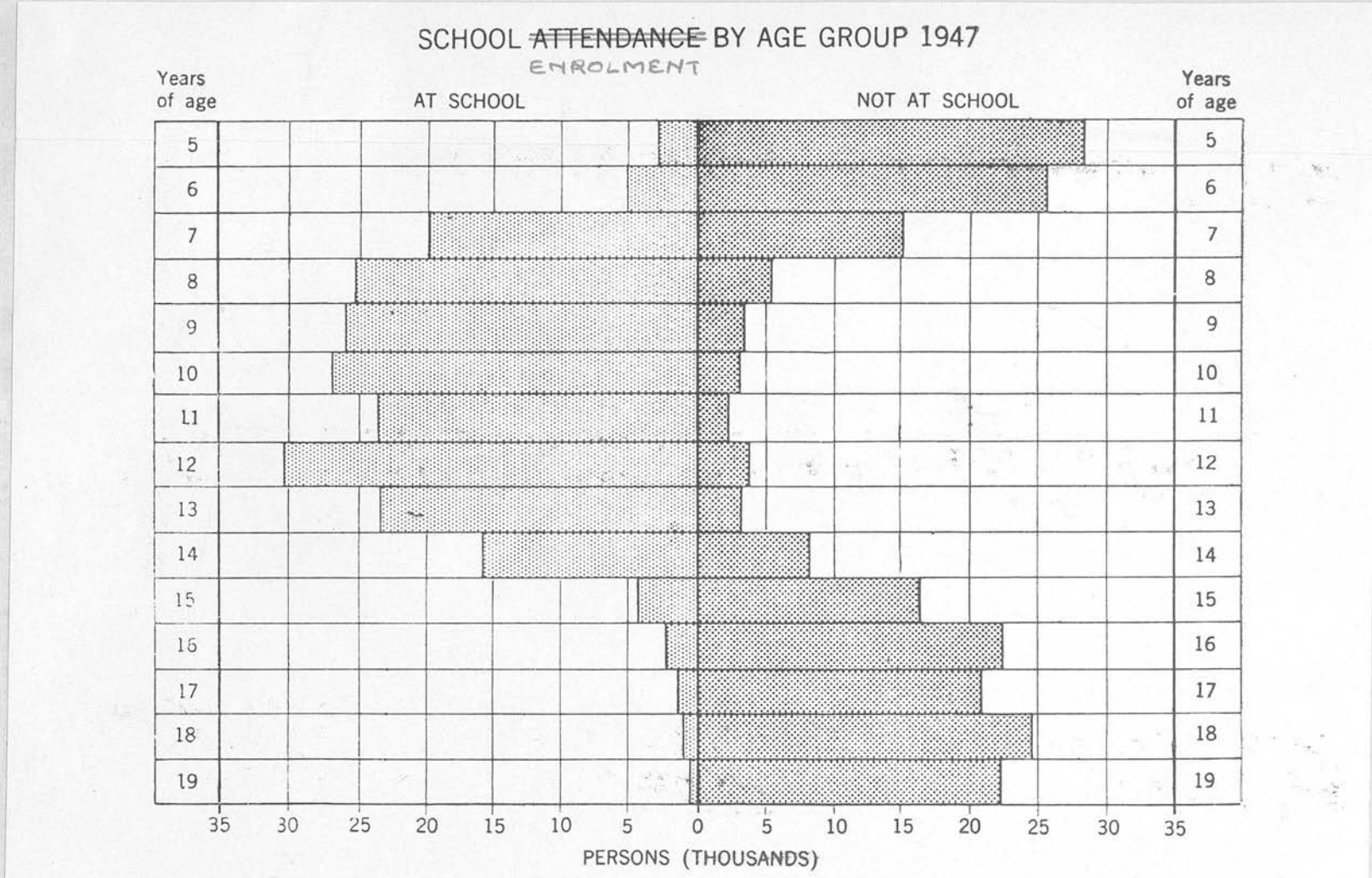
Table 1. PERCENTAGE OF ILLITERACY SINCE 1861

Age	Percentage illiterate				
	1861	1891	1911	1921	1943
5+	69	48	38	39	29
7+	-	-	-	-	26
10+	-	-	35	34	24

The figure of 29%, often quoted as the illiteracy rate, is misleading and unjustified, for children can scarcely be expected to be able to read when they may not be admitted to school until the age of seven. The true figure would seem to be 24%, for the child commonly starts school at the beginning of the Term following his seventh birthday and it is unreasonable to expect him to learn to read much before his his eighth birthday. Table 1 shows the tremendous headway made by schools against the evil of illiteracy in the course of 60 years; there are now more people literate than were illiterate in 1861.

25. At the same time, the figure for 1943 leaves much to be desired, even when one omits those older people who are less likely to have had opportunity to learn to read or who, through disuse, have forgotten how. Of the quinquennial group aged 10 - 14, 14.5% were illiterate and allowance for mental defectives still leaves an average of more than one in tem.

As/


SCHOOL ~~ATTENDANCE~~ ENROLMENT BY AGE GROUP 1947
Years of age
AT SCHOOL
NOT AT SCHOOL
Years of age
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
35 30 25 20 15 10 5 0 5 10 15 20 25 30 35
PERSONS (THOUSANDS)

As might be expected from Table 1, percentage illiteracy increases rapidly with age and exceeds 1 in 5 at the relatively low age of 25-29 but it does not exceed 1 in 3 except at age 70 and over.

26. That the respective percentages of illiteracy for males and females, aged 10+, are 27 and 21 is very probably a reflection of the social and economic structure described earlier. It is more likely that boys would be required to assist in the fields, or even to support themselves, than in the case of girls; it is unlikely that the greater verbal facility of girls, as revealed by the English Tests, could account for such a large difference in literacy between the sexes. This disparity is general throughout the Island though the total illiteracy varies wildly from a minimum of 8% in Kingston (11% in St. Andrew) to 33% in St. Elizabeth (Clarendon, Trelawny and Westmoreland are also over 30%). There is a similar wide range between races, the least literate being the East Indians, 49%(a) of whom were illiterate. Blacks were 28%(a) illiterate while other high illiteracy percentages were: Coloured, 14%(a) and Chinese, 14%(a)(b).

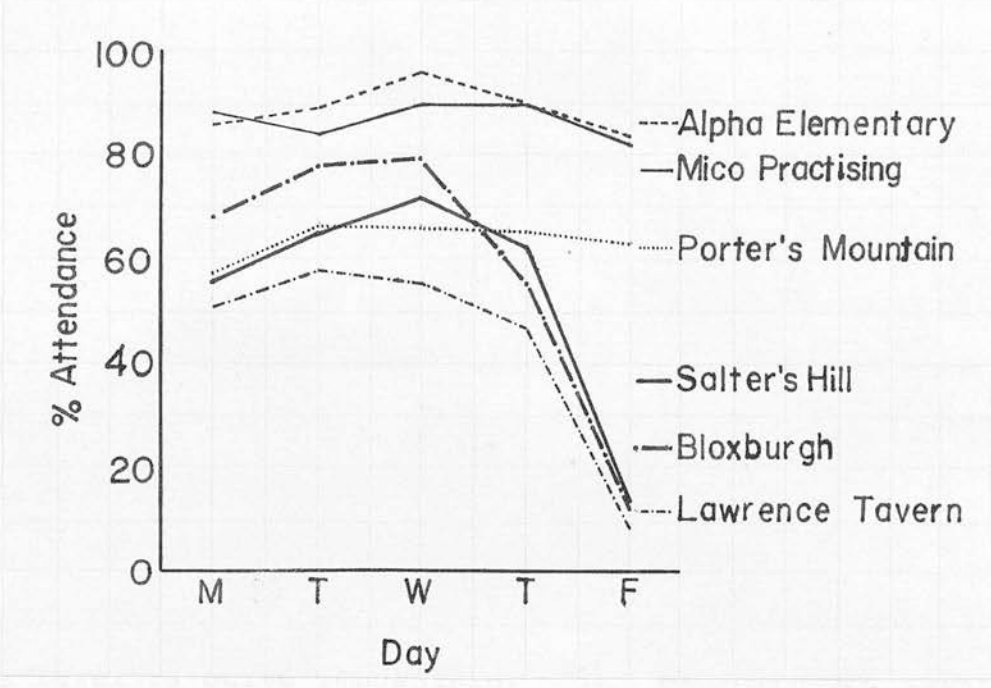
27. The 1943 Census figures present an illuminating picture of school enrolment and attendance. The total school population, 7-14 years of age, numbered 234,519: the recognized accommodation of the elementary schools at that time was given by the Education Department as 56% of that number. This pressing accommodation problem was considerably eased by the fact that only 81% of the school-age population was reported as actually enrolled at school during the four months preceding the census. Further, of those/

(a) These percentages refer to the 7+ population and should therefore be compared with the total illiteracy rate of 26%.

(b) "Chinese coloured" are included in this figure.

those enrolled, 16% did not actually attend school at all during the four-month period while only 33% attended the full period. The average number of months during which those who were enrolled did actually attend was no more than 2·7. Finally, attendance on the several days of the week follows a curve (Figure 1) rising from Monday to approximately equal

FIGURE 1. SPECIMEN CURVES OF DAILY ATTENDANCE



1. The percentage attendances relate to the Summer Term (April-July), 1949.
2. Alpha is in Kingston; Mico in urban St. Andrew; Bloxburgh and Lawrence Tavern in rural St. Andrew; Salter's Hill in St. James and Porter's Mountain in Westmoreland.
3. Bloxburgh is typical only in respect of the decline of attendance on Thursday and Friday; its attendance on Monday to Wednesday is above average.

maxima on Tuesday and Wednesday, declining abruptly on Thursday and dwindling to virtually negligible proportions (10-20% of Tuesday's and Wednesday's numbers) on Friday, especially on Friday afternoon in those urban schools where a Friday afternoon session is held at all. This fluctuation is so regular and so considerable that, for the purposes of the research, one reckoned on only two effective school days per week. It is to be regretted that this state of affairs is accepted/

is accepted with resignation by teachers generally; admittedly, it is of such long standing as to have become a tradition. It is less noticeable in Kingston, e.g. Alpha Elementary, and urban St. Andrew, e.g. Mico Practising, than in the country. There are a few notable exceptions where Heads, making a deliberate effort to eradicate the evil, have had fair to conspicuous success, e.g. Porter's Mountain. In passing, it is significant to note that variation in percentage of population enrolled in the several parishes shows almost perfect correlation ($\rho = .96$) with the percentage of literacy in the several.

28. An obvious corollary to the foregoing is that the standard of education of the population in general is not high. The only available estimate that the 1943 Census can give is based on the people's own evaluation of their achievements. To make this as objective as possible, the people were required to state their class in school at the time of their leaving; any assessment of their success at this level is quite impossible. The figures here quoted refer to the population of post-elementary school-age i.e. 15 and over. 25% of these declared they had never attended school; 11% reached the infant stage or first or second standards; 24% reached third or fourth standards and only 35% reached the fifth or sixth standards before leaving school. Higher than this, 3% had attended secondary schools but less than half of these had reached the School Certificate Form,* while another 1% had had practical, commercial, technical or vocational training. Less than 1% reached Higher Certificate standard or higher. Proportionately more males than females attained the School Certificate Form and higher but at all other levels women had reached a higher standard than men.

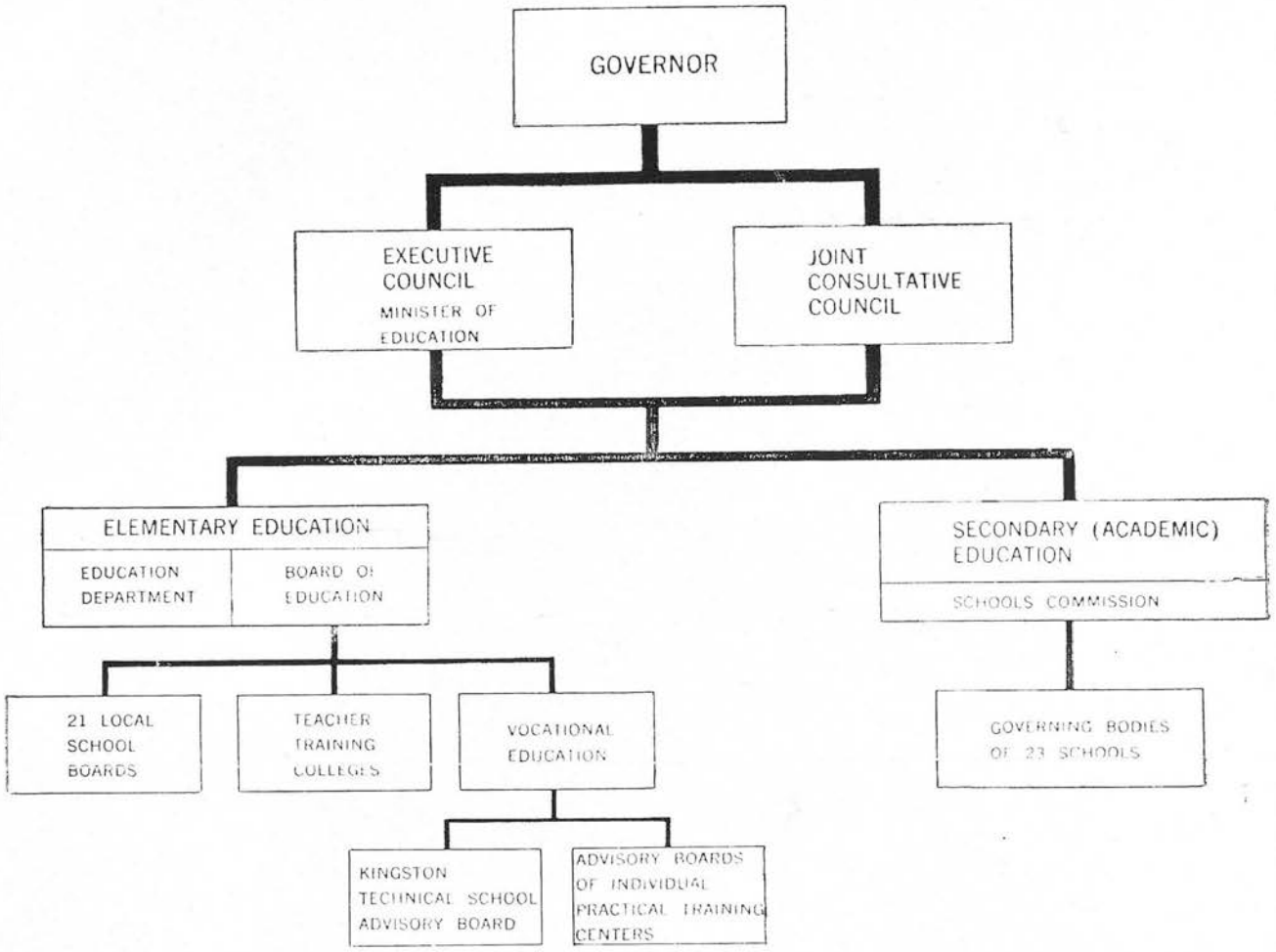
29. Brief mention must be made of the language of the mass/

* This does not necessarily imply that they sat the School Certificate examination.

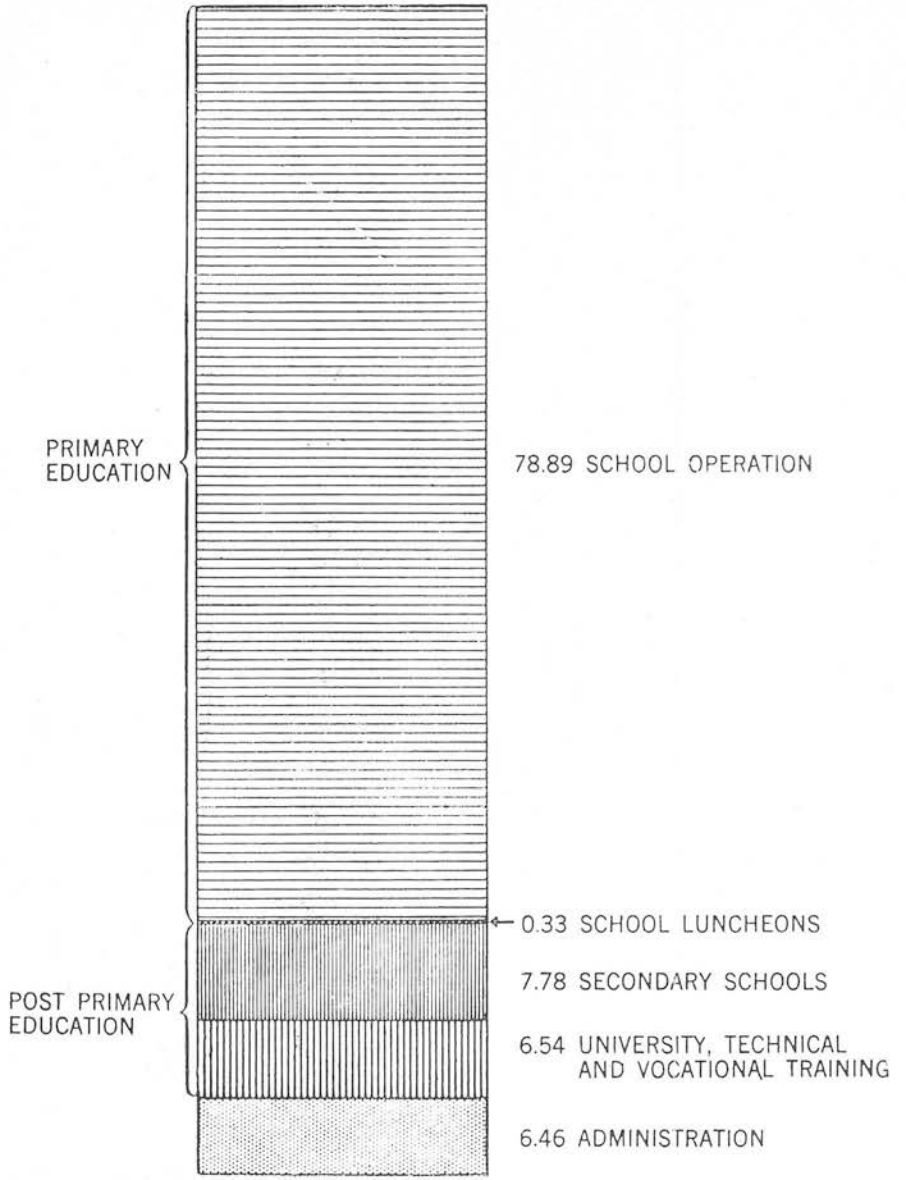
mass of the people. This is universally English but of such a corrupt form as to make it almost completely unintelligible, under some circumstances, to most English-speaking people. It is not an exaggeration to record occasions when the Research Officer, standing quite near at hand, has heard an animated discussion or heated argument between two or more school children or adults without comprehending the drift of the conversation at all and without understanding more than a tenth of what was said. Conversely, similar difficulty is often experienced by natives, especially negroes, in comprehending standard English, no matter how simply framed or clearly spoken. The differences between the two forms of English are extensive, and concern pronunciation, word usage, misuse of plurals and tenses, structure of sentences, grammar and idiom. This fact caused grave difficulties in test construction, especially with respect to the framing of instructions, more particularly where these were to be spoken and not printed. Where it was permissible, teachers were most helpful in "translating" instructions given by the Research Officer into a form readily intelligible to the children.

JAMAICA

ORGANIZATION OF EDUCATIONAL ADMINISTRATION



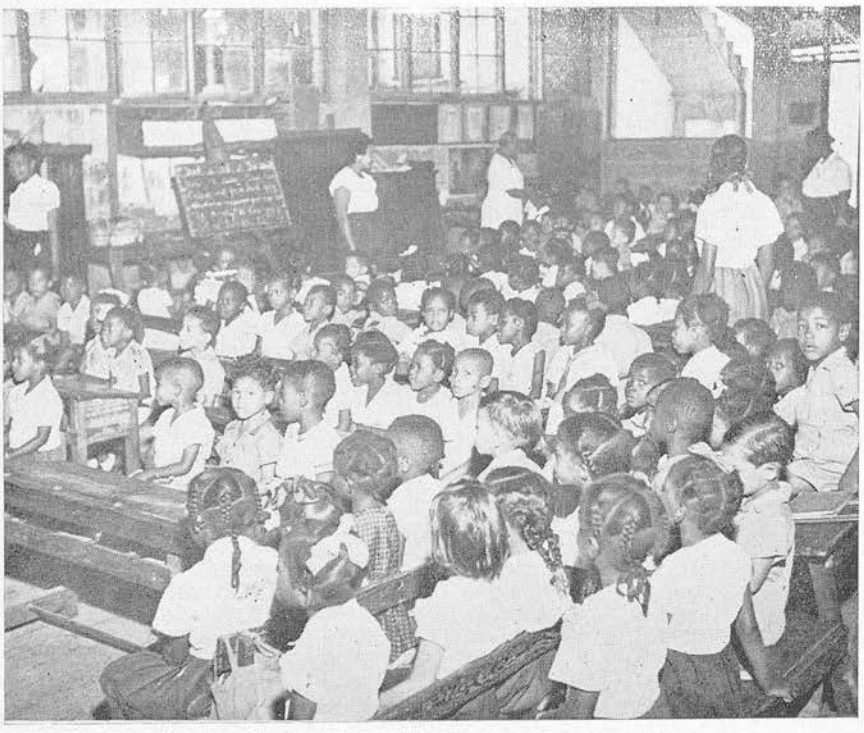
ALLOCATION OF EDUCATION BUDGET (PERCENTAGE) 1946-47

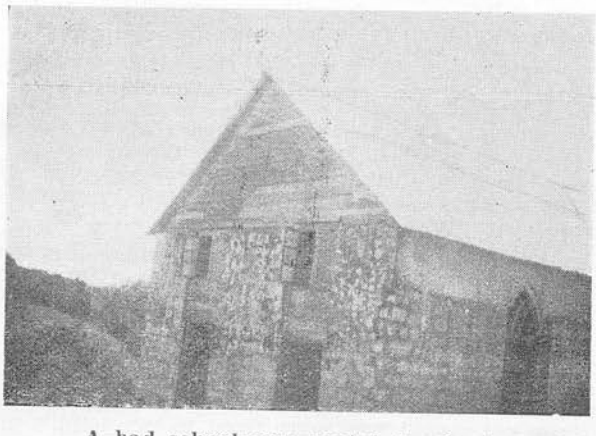


CHAPTER 3 - EDUCATION IN JAMAICA

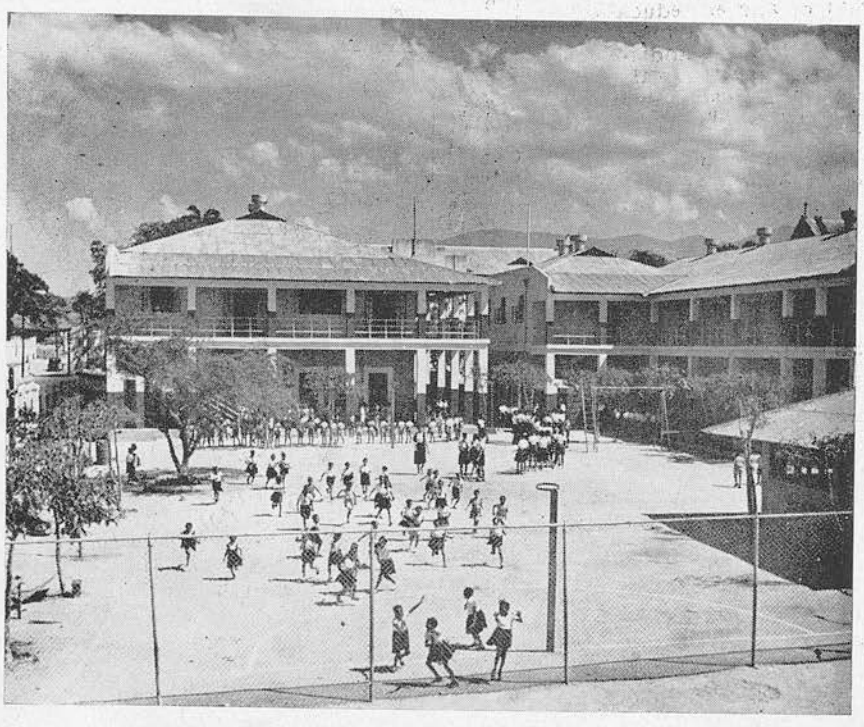
30. The beginnings of popular education coincide with the movement toward emancipation of the slaves and, aided by grants from the Imperial Government, the schools were conducted, as in most West Indian Colonies, by the religious denominations. In 1837 there were 138 schools with 12,000 children on roll but the quality of instruction was poor. The first Inspector of Schools, in 1864, reported that, of a total of 289 schools, no more than 25 could be regarded as efficient. The average salary of teachers was then £38 per annum and the average cost of education per pupil was £1. The foundation of the present system was laid in 1867, confirming the system of grants to denominational schools and establishing regular inspection and central control of elementary schools. In spite of a statute in 1900, precluding the recognition of any new denominational school, the system of dual control still survives through the trend of policy is for Government gradually to assume full responsibility. 62% of a total of 678 elementary schools in 1947 were owned and managed by the denominations. Although dual control creates familiar problems, it must be recognized that the local managers of schools, in the main, perform a conscientious and useful service to the Department, completely without cost beyond nominal travelling allowances.

31. This economy is a matter for thoughtful consideration. Whereas the total annual expenditure on education ten years ago was about £347,000, it is now over a million and a quarter pounds, constituting 13% of the Island's Revenue. One item alone, the maintenance of elementary schools, has risen from £227,500 to more than £700,000. The average cost of elementary education has risen from £5. 8. 5 to £6. 19. 2 per child in average attendance; based on enrolment, the increase is from £3. 1. 10 to £4. 2. 2. Grants for Secondary education have multiplied tenfold from £9,600 to £96,000 while a twenty-fold increase has occurred in the school feeding project from £1,200 to £25,000. Financial contribution to the University College of the West Indies, to name only one new item, has made its appearance in the annual budget. A part (£72,000) of the Department's expenditure has been met by grants from Colonial Development and Welfare Funds, but most of it is the result of efforts of the Jamaica Government. The estimated value/





A bad schoolroom rented by Govt



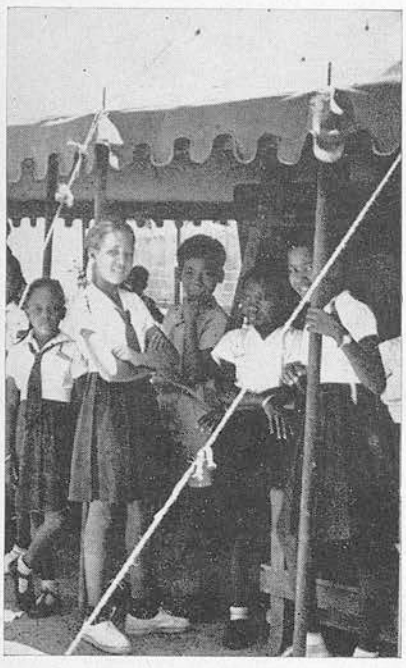
Opposite Page: Above—Old Central Branch School: School built to accommodate 600 cnildren. Daily attendance between 900 and 1,000 daily. Below:— St. Joseph's School, Kingston.

value, in cash and free labour, of the denominations' share during the same period ~~is~~ was £38,000.

32. The chief difficulty of the churches is to maintain their buildings in anything like a satisfactory state of repair or sanitation in spite of the fact that the lion's share of the cost (usually 75%) is borne by public funds. For instance, it is not uncommon for a school to be closed by the health authorities, on account of inadequate toilet accommodation which cannot be provided for the want of ~~a~~ the few pounds constituting the share of the church concerned. In consequence, the fabric of many of the schools is in bad condition and accommodation hopelessly inadequate while benches are insufficient and unsafe and the supply of desks and other equipment meagre. This constituted a serious handicap to the research when, for testing purposes, pupils had to be seated at desks with a generous allowance of space between them. At one school visited in urban St. Andrew (the suburbs of Kingston), the Head Master wrestled with an attendance approaching 1000 on the popular school days i.e. Tuesdays and Wednesdays. The Research Officer, appreciating the accommodation difficulty, endeavoured to restrict his requirements, for desks and space to accommodate 60 pupils, to a small section of a large room that was really insufficient and unsuitable on account of the proximity of other children. The Head Master was very co-operative but, on learning that alternative accommodation would have to be found for more than 200 children thus displaced, the Research Officer sought the temporary use of nearby premises of a Junior Centre of the Jamaica Institute. Following one visit to a country school for testing purposes, it was correctly surmised that the situation was as bad or worse in the rural schools. With few exceptions thereafter, the Research Officer administered all tests in the country from altar steps or a pulpit, the members of his widely dispersed "congregation" being supplied with masonite boards, used alternately, as they chose, as desk-substitutes or as kneeling pads.

33. As part of the so-called 10-year Programme, a determined attack is being made on this formidable problem of accommodation. In spite of all the difficulties of shortage of materials, twenty new buildings are being erected/

Cheap Accommodation



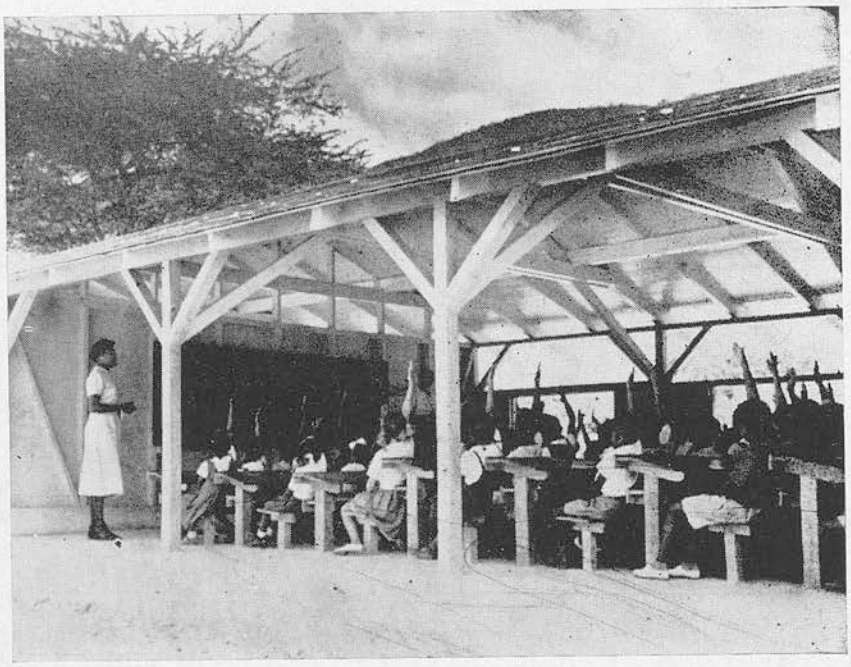
Using a tent to reduce accommodation costs.

THE TORCH

"....there will always be.....the yard."

A Geography Lesson

Open-air Classroom



being erected every year. Another economical plan is the construction of open-air classrooms having no walls; an average of about ten of these are erected per year. During the last five years an average of more than 2000 new places has been provided per annum. Unfortunately, the birth rate is also increasing so that much, if not all, of this increasing accommodation is absorbed merely in maintaining the status quo. In some schools, tents and thatched huts are being pressed into service to provide temporary additional accommodation while, in a climate like that of Jamaica, there will always be the tree in the yard.

34. Outside of Kingston and the larger rural towns, the population is well scattered through the countryside. Thus, only one in ten schools has an average attendance of more than 300 pupils while nearly half have less than 150; "Special Schools", amounting to 12% of the total, have less than 70. It follows, therefore, that a very large number of schools had to be visited if anything approaching a random sample of schools ~~were~~ was to be chosen. Access to many, if not most, country schools was by tortuous, bumpy, often precipitous roads that set the whole body of a car, especially if of English manufacture, into paroxysms of vibration. Several, especially the smaller schools, were quite inaccessible by car. To reach one school, only five miles inland from a well-metalled coast road, but more than 3000 feet above it, the first three miles were accomplished by ex-U.S.Army "jeep" along, but mostly up, the dry bed of a stream that acted as road. Beyond this point, even a jeep could not proceed and it was necessary to have recourse to the tender mercies of not very tender mules. The owner of the jeep, who had been lured by a desire for adventure into leaving home at 8 a.m. to accompany the Research Officer, took one look at the mules and another at the objective, nearly 1000 feet higher, and then retired to Kingston for the rest of the day. The remainder of the journey, but especially the return journey, while no doubt a commonplace matter for the residents, was an experience which the Research Officer had no desire to repeat too frequently. However, the exquisite views and delectable climate at the summit amply compensated for the discomfort of the journey, even though it had been undertaken for the sake of testing only 19 pupils.

The enrolment/

35. The enrolment in elementary schools reaches a new record figure each year. In 1948-49, over 190,000 pupils were enrolled; during the previous four years there had been an average annual increase in this figure of nearly 5000. Children must have attained their 7th birthday before admission and must leave on attaining their 15th. These ages do not completely suit the economy and convenience of the home. It is more convenient to have the younger children out of the home and off to school, while the older children are needed to tend the young or to help in the fields. To achieve the first objective, children's birthdays are very commonly mis-stated while the second presents no difficulty at all. It must be added, however, that many parents send their children to school early because they genuinely feel that their education should begin before seven. In this event it is common for the child's real age to be revealed and substantiated by birth certificate* when it appears, from school records, that the child has attained the age of 15. By far the commonest tendency, however, is to remove them early. It is estimated that, in 1947, 44% of the 14-year old population did not attend school. Of the 13,974 who did, only 32.2% had completed a full school life of 8 years. Table 2 shows the percentages who had completed shorter periods.

TABLE 2. LENGTH OF SCHOOL LIFE OF 14-YEAR-OLDS IN 1947.

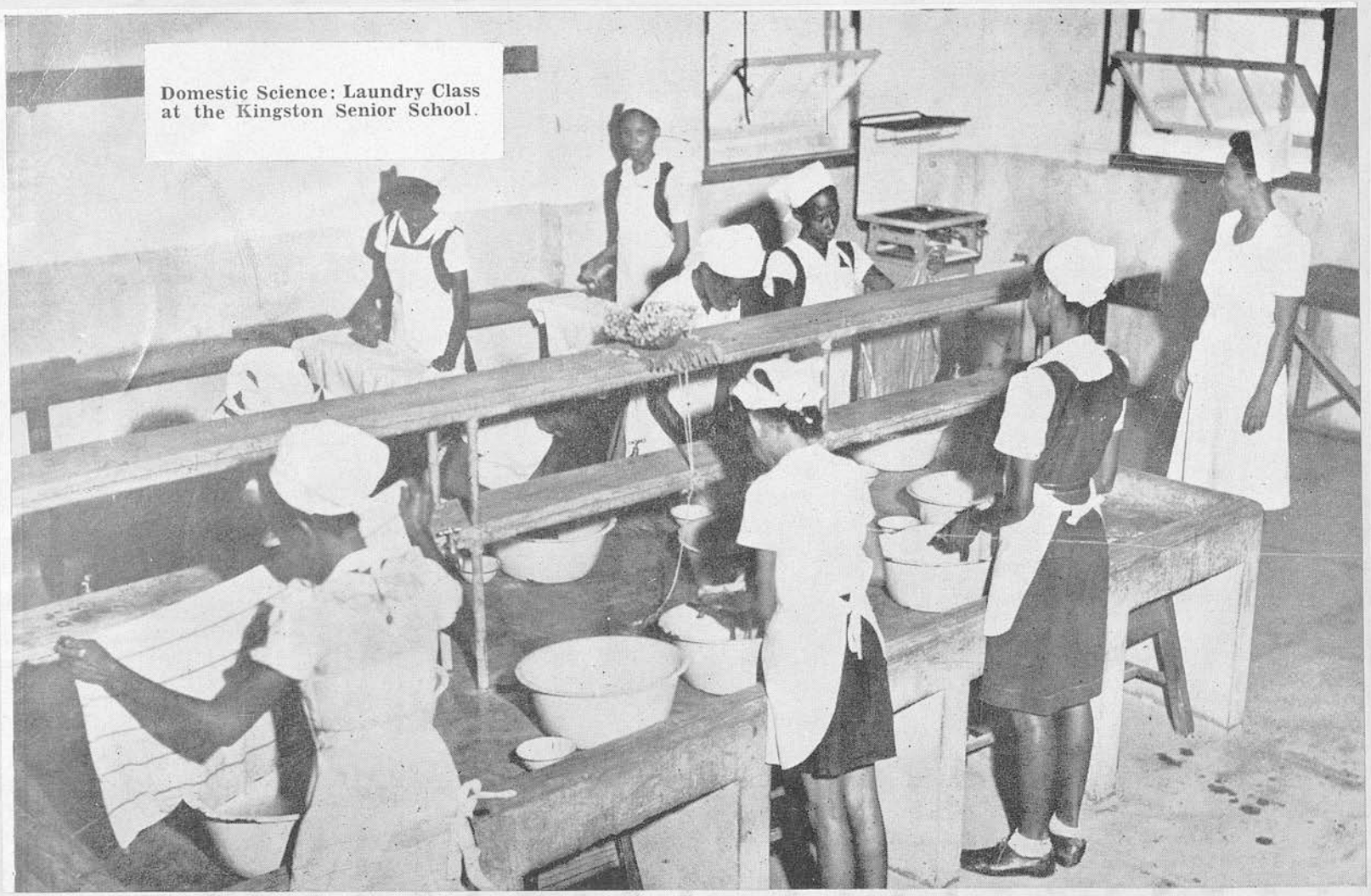
Number of years at School	1	2	3	4	5	6	7	8
Percentage of 14-year-olds	0.7	1.1	2.1	3.1	6.3	14.0	40.5	32.2

If those who had already left, together with those who had never attended, were to be included in Table 2, the percentages in the lower numbers of years would be considerably increased. Average attandance, based on the 288 best sessions of all schools, varies from 65% - 68% but there is extreme fluctuation during the year, depending chiefly on weather and economic conditions. The two extremes in 1946-7 were 42% and 66% (these figures take all sessions into consideration).

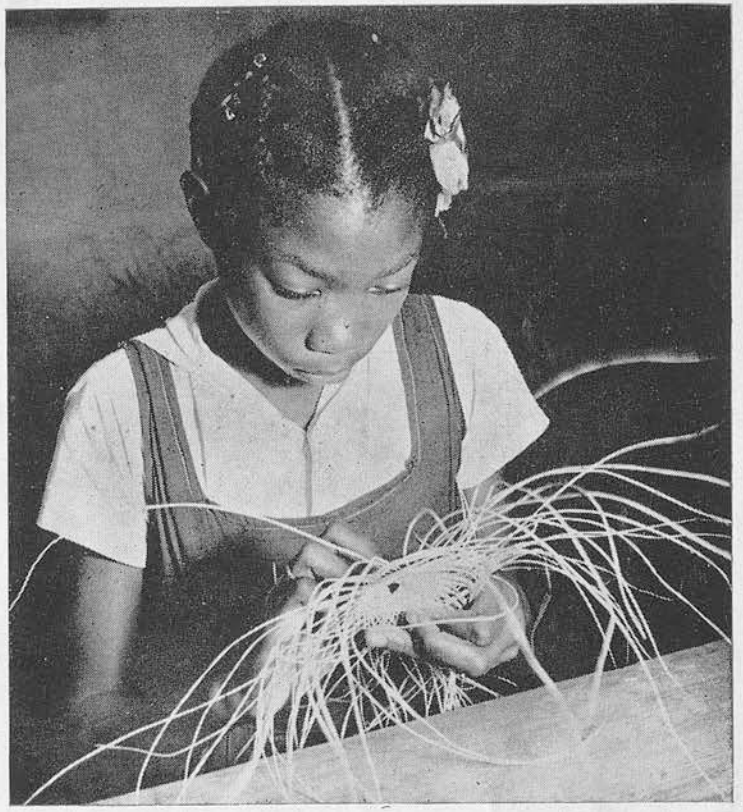
* For educational purposes, a birth certificate can be obtained at a nominal charge of 6d for search and certificate.

36. The teaching force, both in numbers and quality, is limited, like other features of the schools, by the funds available for salaries and training. This is possibly the chief reason, though it may also be traditional, why four-fifths of the teachers are women; it also accounts for the fact that 55% have had neither secondary education nor training in teaching. Two teachers only, out of a total of more than four thousand, are graduates with professional training; two more are graduates without training. 2½% have had secondary education but less than half of these had training. 97% of all teachers have had elementary education only followed, in the case of less than half of these, by a training college course. Regarding status, one-third are probationers or pupil teachers. These figures portray a vicious circle, with the limited horizons of the teachers' outlook and experience depressing the quality of the education the schools provide which, in turn, limits the quality of the next generation of teachers. It is a great disappointment to many that the secondary schools have not broken this circle - that their pupils look with disfavour on elementary school teaching as a career. The four training colleges, one for men and three for women, make the only great contribution to raising the standard of teaching, but draw, for their students, largely ~~on~~ from the ranks of the probationers with elementary education. Government maintains only one of these; two are denominational (Moravian and Roman Catholic) while the men's college is endowed by the old Mico trust. These colleges together added 54 women and 40 men to the ranks of trained teachers in 1949. An increasing number of probationers, failing to gain admission to training colleges, take the examinations, including practical teaching, externally. An ambitious scheme, to provide training externally for 240 such probationers per year, has so far not been implemented for lack of funds. Vacation courses also help mitigate the evil.

37./

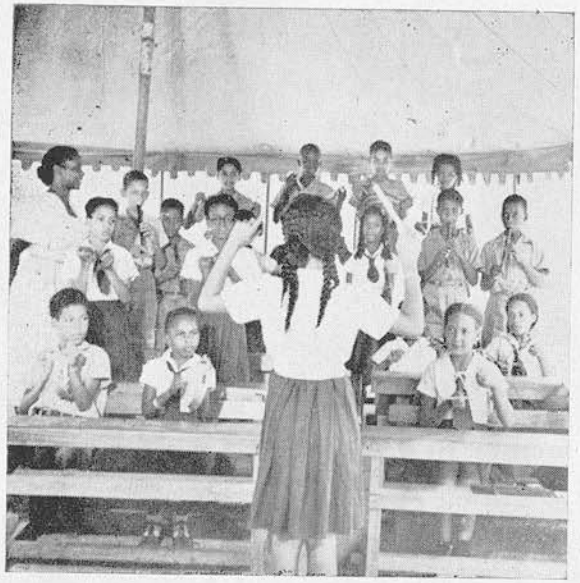


Domestic Science: Laundry Class at the Kingston Senior School.



Making a Hat

Left:—Music at Franklin Town Elementary School, Kingston.



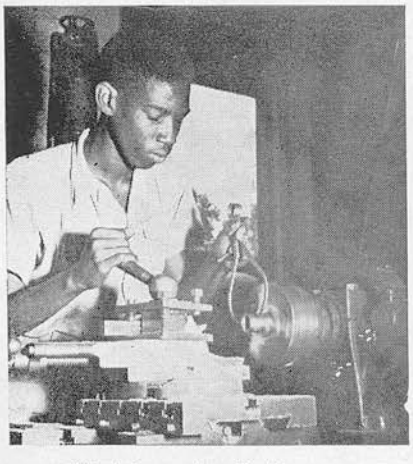
Manual Training Class at the Kingston Senior School

37. It will be appreciated that the curriculum, quality of instruction and standard of attainment are considerably restricted, from the foregoing description of the circumstances under which the schools are conducted. Competence in the three R's is the prime aim of instruction and full achievement of this aim cannot be taken for granted. Crowded conditions and shortage of furniture make individual work by the pupils extremely difficult to organize and limited in quantity. For the rest, the teacher relies on "talk and chalk" and even use of the latter may be restricted by the blackboard space at hand. In the absence of proper facilities for teaching and individual exercises, it is not surprising that rote learning abounds. During recent years, there has been a welcome increase in the amount of practical work undertaken. Foremost in this trend is agricultural training. A "square chain garden", which is the older type, is to be found at almost all rural schools but nearly a third of the schools now have an "extended garden" if land is available. Apart from the agricultural training which these afford, animal husbandry is provided for, and tree planting is also encouraged. Where the school also has a canteen, much of the food for the midday meal is produced in the garden. As interest in this activity is projected to the home, the extended garden often becomes a centre of communal interest. Domestic Science and Manual Training are spreading but severely restricted by the lack of equipment. Handicrafts, requiring less equipment, and Physical Training are being extended as fast as vacation training courses can supply teachers properly equipped for this work. Much depends on the initiative and enterprise of individual teachers.

38. For the better pupils who are not successful in obtaining entry to secondary schools, there is a series of three "Jamaica Local Examinations" designed to cover a course of three years in academic subjects and intended for children at ages 12-16. Initially, these examinations were devised for pupil teachers but by far the majority of candidates are pupils and former pupils in search of paper qualifications. Much has been said against continuing these examinations on their present wide basis but they continue to grow in popularity to the extent that, with ten thousand candidates annually/

Repousse Metal Work

THE KINGSTON TECHNICAL SCHOOL



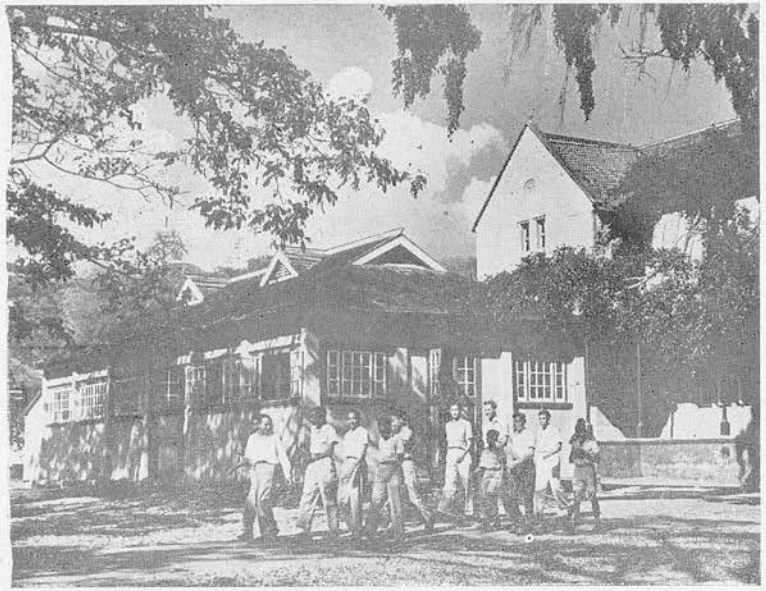
Working at a Lathe

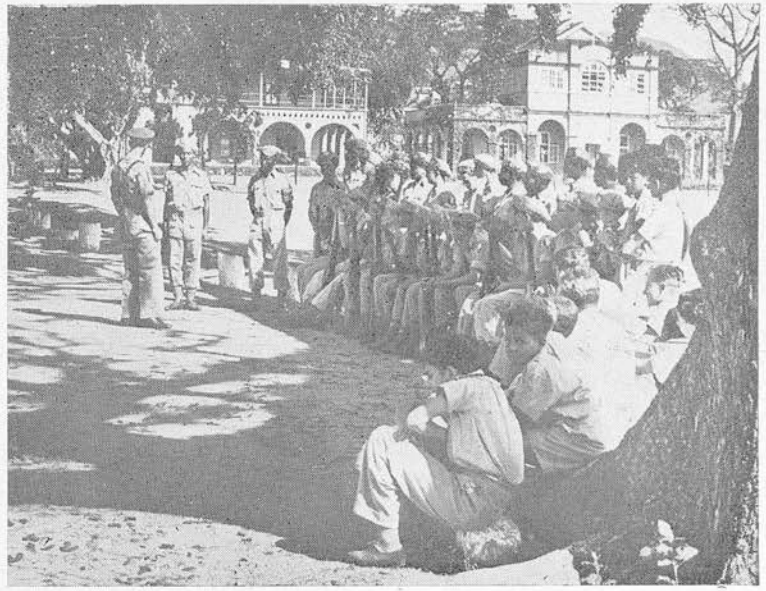
Electric Welding

annually, their conduct, especially the marking of papers, has become a major administrative problem. These examinations, which are essentially tests of attainment, are not to be confused with the "Jamaica Local Scholarship Examination" whose sole purpose is ~~for~~ the award of scholarships tenable at Secondary Schools and in certain instances to select pupils for admission. This examination is taken by fewer children at the age of 11-12+.

39. Technical education is provided at Kingston Technical School, which is the only school of its kind in Jamaica and, indeed, in the West Indies. It is controlled by the Director of Education with the aid of an Advisory Committee. This provides three main courses: technical, trades and commercial with domestic subjects for girls. Evening classes are held as well as day classes with a total enrolment of as many as 1400 pupils, besides which manual training and domestic science classes are conducted for 400 elementary school children. Special rehabilitation classes were conducted for ex-service personnel in post-war years. The school had a staff of 63 in 1947, 32 of these being full-time. Candidates are prepared for the Royal Society of Arts and City and Guilds examinations. There are also three Practical Training Centres for boys and one for girls of post-primary school age. They are vocational schools giving training chiefly in agriculture with related skills. The girls' centre trains its pupils chiefly as home-makers and it also conducts a daily clinic for the local community. Finally, there is the Jamaica School of Agriculture for older students where more intensive training in agriculture is given.

40. Local terminology restricts the title "Secondary School" to 26 institutions, with a grammar school type of curriculum, controlled by the Jamaica Schools Commission of which the Director of Education is Chairman. Some of these are endowed schools, backed by trusts as much as two centuries and more old, though none are financially independent of government aid. Fourteen are conducted by the denominations and only two are owned and maintained by Government. Only eight are co-educational ~~but~~ and there is mixing of the several races but, having regard to their respective proportions in the population, there are relatively more white and light-skinned/





A Secondary School: Jamaica College, where boys are taught up to the Higher Schools Certificate Standard in such subjects as Mathematics, Chemistry, History and Languages.

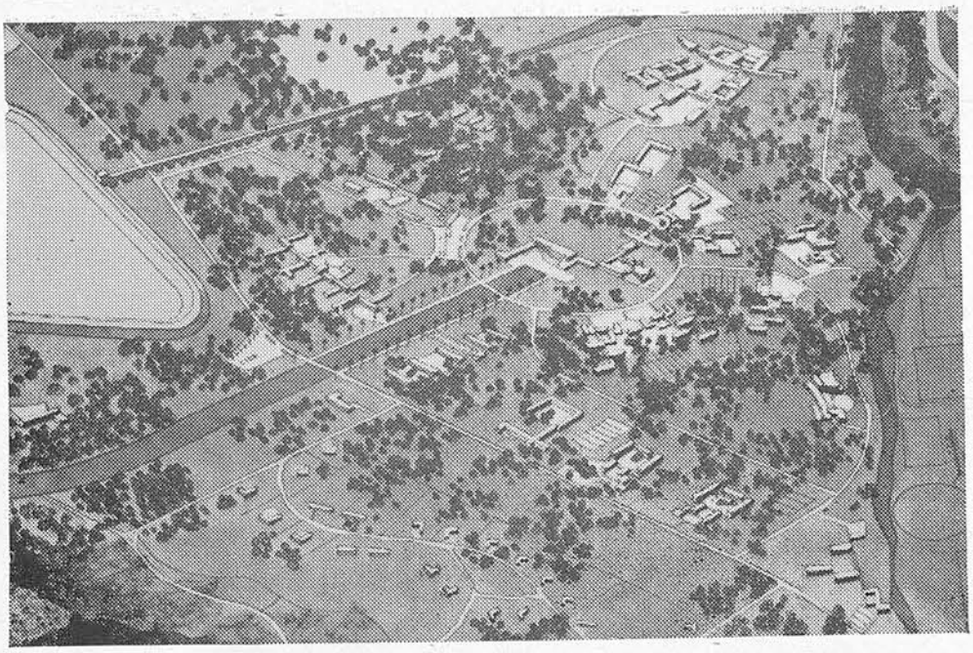
skinned pupils than black. There is a much larger number of private or independent secondary schools receiving no government aid. The size and quality of these vary enormously and very little can be said about them as they are not inspected. A bill for their registration was introduced in 1947 but it was deferred by the House of Representatives. They are left out of consideration in the following paragraphs.

41. The total number of pupils enrolled has increased during the last five years from about 3920 to 4928 but this latter figure includes three schools newly recognized during that period. Allowing for this, the percentage increase was not less than 20% during that period. As might be supposed, the average attandance (94%) is much higher than in elementary schools. 12% of the pupils receive free tuition, with or without free boarding, and a further 4% receive part free tuition. A total teaching force of 331 allows for a teacher-pupil ratio of 1:15 which, by elementary school standards (1:52), is extremely generous but it must be remembered that nearly half of the schools provide boarding facilities. Many of the teachers are recruited from the United Kingdom as the supply of local qualified teachers is wholly inadequate. Only 37% were graduates, a third of whom had a diploma in teaching. 39% had Higher School Certificate Training College Certificate or Special Subject qualifications in Music, Art, Shorthand, etc. 24% had none of these qualifications. "These "figures reveal the steadily worsening situation - a dwindling supply of "graduates to teach an increasing number of pupils - more laboratories "and fewer science graduates to teach in them. No year passes without one "or more of the leading schools having been hopelessly handicapped by lack "of staff, nor is there any prospect of easier overseas recruitment in "the coming years". (Report of Jamaica Schools Commission, 1949).

42. In general, the curriculum is limited to examination subjects except that science has only recently become more general since special grants were paid for the erection and equipment of laboratories. The shortage of science graduates in the United Kingdom is now a limiting factor. "There is a growing but still insufficient appreciation of the "importance of Physical Education, Art, Handicrafts and Music Appreciation". (Annual Report, 1946). Pupils are prepared for the examinations of the Cambridge/

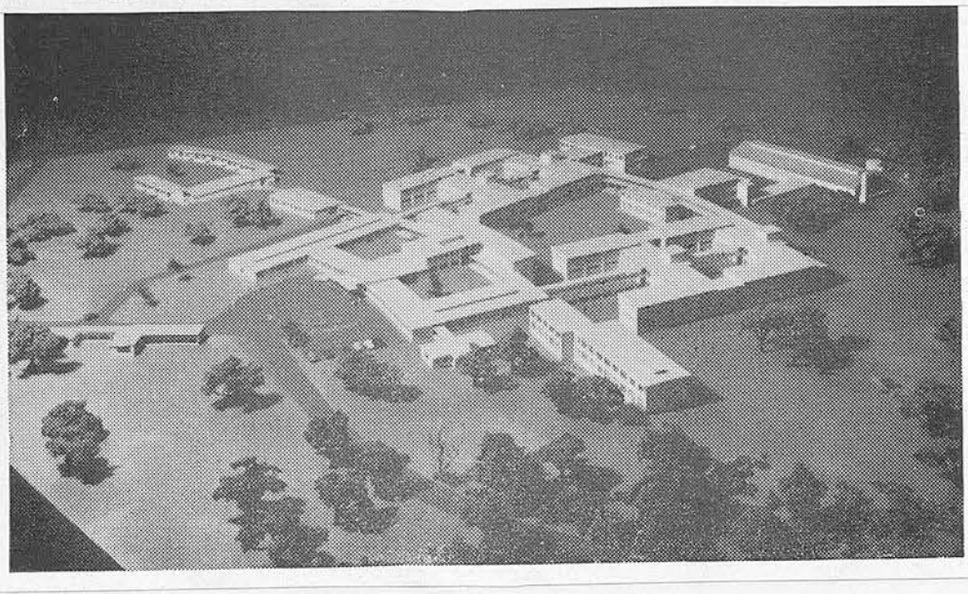
Cambridge Syndicate, the Junior Examination having been discontinued in 1950. It is estimated that about three out of four pupils admitted ultimately take the School Certificate with about 70% success. Since many of the schools have not the facilities or staff to prepare pupils for Higher School Certificate, only about one-sixth of those pupils who take School Certificate proceed to complete a VIth Form course with about the same average percentage success.

43. In 1943, a committee was appointed to enquire into the system of secondary education in Jamaica. Professor L. L. Kandel of Columbia University was appointed Chairman. Its chief criticisms were "the com-"partmentalisation of elementary, secondary, vocational and other forms "of education", (Report of the Committee to enquire into the System of Secondary Education in Jamaica; para. 57) and confusion between the formulation of policy and administration. It recommended the establishment of a single central authority whose main function should be the formulation of policy, leaving administrative functions to a staff of expert officials. Chiefly because the age for beginning secondary education was not defined and because standards of admission of fee-paying pupils were left entirely in the hands of each school, the committee found "no proper articulation "between elementary and secondary education (loc. cit. para. 36). ~~In order~~ To promote this articulation, a common examination was recommended at the age of 12 "in order to discover the type of school ~~not~~ most suited to "the abilities of pupils, and to regulate the entrance of pupils, whether "fee-paying or otherwise, to publicly maintained or aided post-primary "Schools." (loc.cit. para 188 (8).) To achieve adequate diversity of school types within the unified system, it recommended the establishment of more senior schools, more practical training centres and more opportunities for junior technical education. In addition, since the general abolition of fees in secondary schools was unlikely for some time to come, "the proportion of places in secondary schools, awarded solely on the "abilities of the pupils, should be progressively increased, either without fees/



NEW WEST INDIES UNIVERSITY BUILDINGS: An indication of the long term development of the University site from the top of Long Mountain

A model of the Teaching Hospital, exclu ding the Obstetrics Department.



A scene inside the Junior Centre of the Institute of Jamaica.

"fees or with fees graduated according to the parents' means" (loc.cit. para 188 (12)/) It urged the adaptation of the curriculum of all schools to the cultural and economic needs of Jamaica, irrespective of the requirements of external examinations. For the training of local secondary school teachers, it recommended scholarships tenable abroad, as the demand did not warrant the establishment of a training college (for secondary school teachers) locally. It urged a survey of vocational opportunities to avoid middle class unemployment.

44. Provision is made for higher education in three ways:

(a) External Examinations of the University of London are conducted by the Jamaica Schools Commission;

(b) Scholarships to Universities in the United Kingdom and Canada and

(c) University College of the West Indies.

London externals (matriculation, intermediate and degree examinations) are held annually with about 5 candidates per annum gaining degrees in Arts (including honours) Commerce, Law, Science and Economics. Candidates make private arrangements for their tuition. About 30 university scholarships are in force at any one time. These include Rhodes Scholarships, agricultural scholarships and a private benefaction. Together with the other West Indian Colonies, Jamaica contributes to the University College of the West Indies which now has three faculties of medicine, science and arts in operation. Research is being undertaken by the Institute of Economic and Social Research while the Extra-mural Department, the first to function, now conducts 156 classes throughout the contributing territories.

45. Other agencies ineducation include:

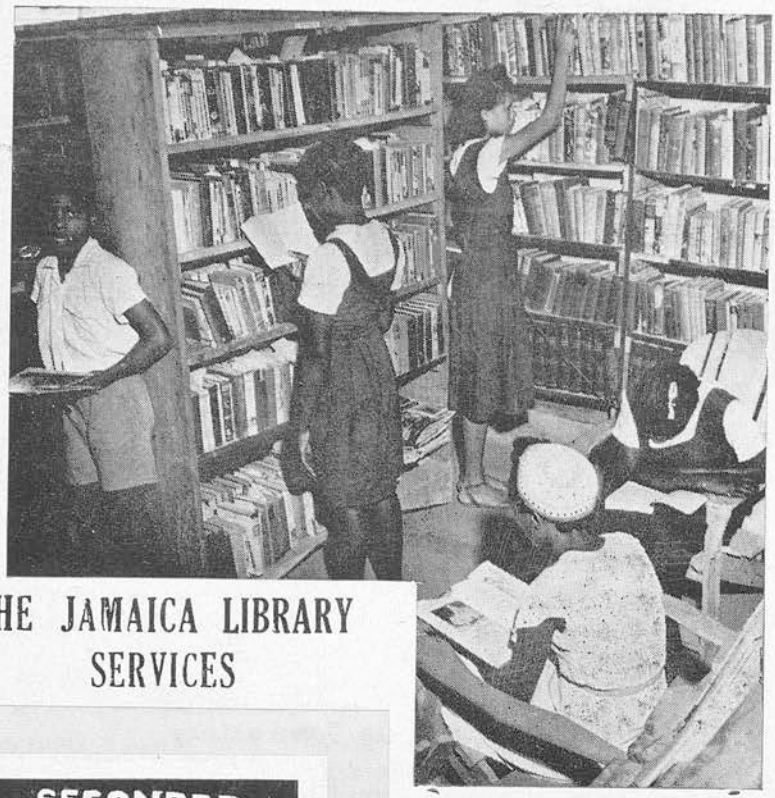
(a) The British Council is particularly active in drama, music, visual education, library facilities and also provides scholarships tenable in the United Kingdom;

(b) The Institute of Jamaica, partly maintained by Government Grant, has an excellent West Indies Reference Library. Its "Junior Centres" provide library and other facilities for children. It also has a Natural History Museum and History, Art and Exhibition Galleries; and it is responsible for the Archives at Spanish Town;

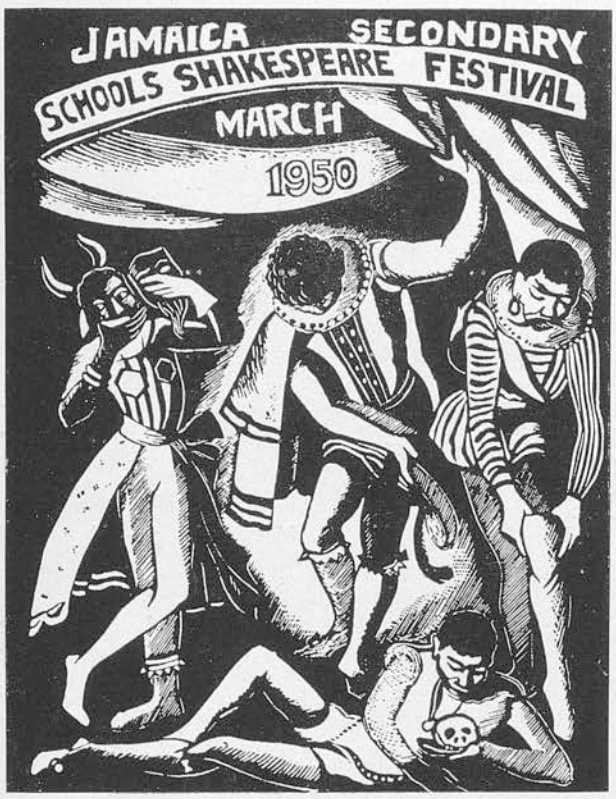
(c) The Island Library Service, financed jointly by the British Council and the Jamaica Government, maintains libraries in the several parishes;

(d) The Medical Department operates the Bureau of Health Education which provides courses for teachers;

4 H Clubs/



THE JAMAICA LIBRARY SERVICES



Cover designed by British Council Scholar, Albert Huie, for festival programme

(By courtesy of the West Indian Review)

"RUDE MECHANICALS AT COURT"
"Pyramus and Thisbe" at the Shakespeare Schools Festivals March, 1950.

(e) 4-H Clubs, a youth movement, aims at better standards of home life and progress in agriculture, through the proper management of the thousands of small holdings throughout the Island;

(f) The Social Welfare Commission, formerly Jamaica Welfare Ltd., co-ordinates all kinds of welfare services chiefly among the peasant population;

(g) The Child Welfare Association is concerned with the pre-school child and conducts an Infant Centre in Kingston;

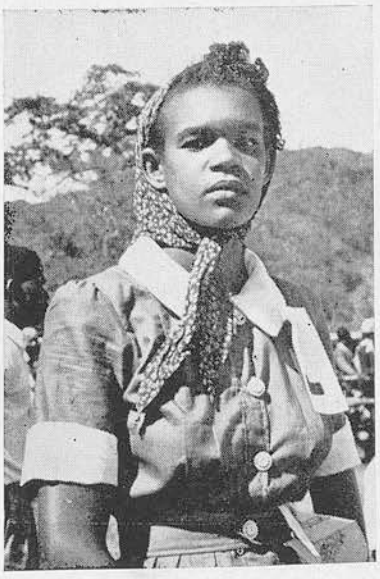
(h) The Broadcasting Station conducts a wide range of educational programmes and

(i) The recently appointed Authority for the Care and Protection of Juveniles now co-ordinates the work of Juvenile Courts, the Industrial (i.e. Approved) Schools, Probation Officers and others concerned with delinquents and children needing care and protection.

(j) A Mass Literary Campaign, inspired by Dr. Laubach some years ago, declined for want of sustained enthusiasm.

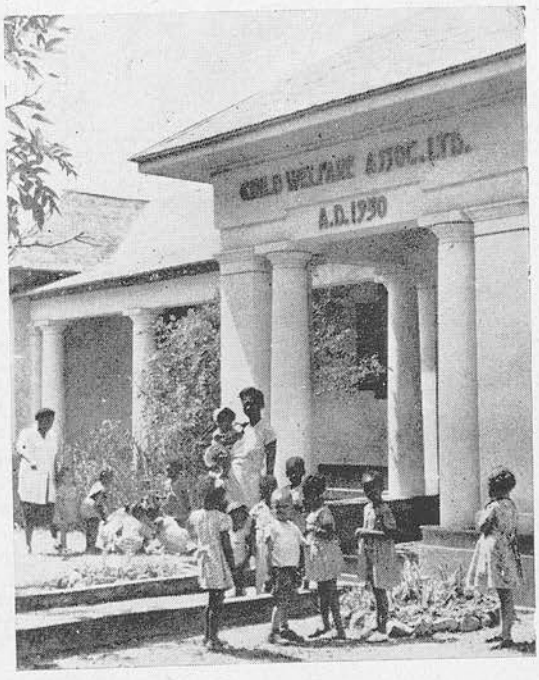
The making of comfortable rope halters for animals and the splicing of ropes are special features of 4-H Club training.

Inez Elletson — Coley Mountain 4-H Club represented Manchester at the All Island Achievement Day held at Grove Place in 1949, where she took first place in Judging Dairy Goats.



Ronnie Jones of the Leeds Group was presented with the Bronze Cross by His Excellency the Governor, Sir John Huggins at the All Island Achievement Day held at Grove Place in 1949.

The Bronze Cross is Scouting's highest award for bravery. Ronnie descended a fume filled pit and rescued a workman.



Above:— For what they are about to receive . . . Children at the Infant Centre, West Race Course, Kingston, are truly thankful.

Left:— The Creche at West Race Course, Kingston.

Chapter 4. Aims and Work of the Research Unit.

46. The title of the research was: "An Investigation "of the Ability and Attainment of West Indian School "Children". It was deliberately comprehensive so that, on direct acquaintance with the educational system and after consultation with the Department of Education, it was possible to begin where effort seemed most necessary. The title also allowed for devoting attention to problems that suggested themselves in the course of the research provided that their urgency warranted a degree of priority. Finally, reference to the West Indies provided for such attention to other colonies as time and facilities allowed and as progress in Jamaica made desirable and expedient. It has already been mentioned (Chapter 1) that activity outside Jamaica was more limited than was originally intended and was conducted according to an amended plan.

47. From the outset, the fundamental aim was adopted of affording as much immediate practical assistance to education authorities as was consonant with the prime function of pursuing research. This aim was well justified by subsequent experience. The Department was confonted with certain pressing problems whose solution demanded specialized attention which the Department could neither supply nor finance. Foremost among these was selection for secondary education and commendable efforts had already been made by teachers and other officers. Urgent solution of this problem was an economic necessity, if the limited funds available for secondary education were to produce the maximum benefit to the Colony. There was no sure prospect that the research would be continued beyond the short life of the Research Unit. Consequently, the Department was anxious that a solution of the problem be supplied, not only for the duration of the research, but for as many future years as possible. This immediate

and/

and practical goal lent a sense of urgent reality to the co-operation freely given by the Department and its officers. The same spirit imbued the staff of the Unit which also benefited, not only by facilities readily afforded, but by a greater amount of active assistance than it could pay for.

48. The first task undertaken, however, was the construction of two short adult group tests of intelligence, verbal and non-verbal, to assist in the selection of candidates, in March 1948, for admission to Mico Training College for men in 1949. These tests were also used by the Unit in recruiting its own junior assistants from time to time. Later, they were also used, on three occasions, in the entrance examinations of two other training colleges for women teachers. Since a full standardization was not possible, these tests were administered, together with other adult tests, to several different groups of adults including university undergraduates, teachers, ~~Sixth~~ VIth Form secondary school pupils and students in the School of Agriculture. Their mean scores appear in Appendix 7, page 179.

49. In May, 1948, the Unit undertook to prepare a battery of tests (Intelligence, Arithmetic and English) for use in the Local Scholarship Examination in September of that year. According to custom, papers in General Knowledge and English Essay were also to be included but for these the Unit did not accept responsibility. For reasons of secrecy, the Schools Commission always insisted on having these papers printed in England. At that time, not even the drafts were completed and it was quite impossible to have the completed tests ready for despatch to the printers in England by June. Accordingly, the Unit undertook to duplicate the tests, under conditions of strict secrecy. This was a colossal undertaking as 2000 copies of each test were required and detailed instructions/

instructions for administering the tests had to be prepared. A great deal of overtime was involved for the Unit's small staff under trying conditions as the work was proceeding through the heat of summer. In response to the School Commission's request to preserve the secrecy of the papers beyond the examination, so that they could be used in a future year, elaborate precautions were taken to ensure that every copy of every test would be returned. Preparations were completed with time to spare so that, when the Commission reported that the printers in England would not have the Essay and General Knowledge papers ready in time, the Unit was able to offer to duplicate these, too.

50. In June, 1948, the Department held a conference of Inspectors and Assistant Inspectors and the Research Officer was invited to address them. This was a valuable opportunity for getting to know that body of men who were to prove of inestimable assistance in the research. The opportunity was taken of outlining to them the steps in the construction of tests, the principals underlying their construction and use and instructions for administering them. At the end of August, detailed instructions were sent to them and, in the three days preceding the Examination, the Research Officer went on tour of all fourteen parishes and discussed the arrangements and instructions with them. It was quite evident that the Inspectors had a thorough grasp of the procedure and could be relied upon to comply strictly with the detailed instructions. At two country centres, the Research Officer had opportunity of confirming this impression by observing the examination in progress. Further, when the scripts and accompanying documents were returned, together with reports from each parish centre, it was clear that the conduct of the examination had been quite satisfactory and uniform procedure adopted throughout the Island.

51. Following the Local Scholarship Examination in September, 1948, the Unit supervised the marking and checking of all scripts. This task, and the marking of subsequent sets of scripts, suggested that the marking of objective tests is not nearly so objective as is commonly supposed. While ambiguity between alternative answers can be totally removed from a test by careful construction, yet ambiguity between methods of indicating the correct response and between the child's real and apparent intention can enter in to a considerable extent. Following this discovery, extreme precautions were taken to ensure uniformity of judgment in assessing the correctness of an ambiguous response. With tests marked in Jamaica, this was made possible by referring all doubtful answers in the last resort to the same individual as judge who kept a careful record of each instance and established standards by which each such case was decided. When, in the West Indies Survey, the bulk of the markings was being done out of Jamaica, lengthy detailed explanation of these standards was circulated, with the answer keys, as well as an illustration of a specimen marked page deliberately filled with ambiguities (Appendix 5, page 168.) It was hoped, at some time during the research, to investigate this element of subjectivity in the markings of objective tests by submitting two sets of scripts,

(a) worked by children,

(b) deliberately filled with ambiguities by the Research Unit staff, New line to a number of teachers, together with answer keys, but

(1) Without the explanation prepared for the West Indies Survey,

(2) With this explanation. New line There being many more important matters and too little time, this experiment was never conducted.

52. The marking completed, it was necessary to effect a makeshift standardization to make allowance for age/

age when deciding the relative merits of the candidates. This standardization is described later. With the supervision of the conversion of raw scores to quotients the Unit's responsibility for the Scholarship Examination ended except that some guidance was given to the Department and the Commission in the use of the quotients, especially in combining them with scores in the Essay and General Knowledge papers.

53. The results of the Local Scholarship Examination, 1948, and parallel data on the candidates, were analysed in some detail with regard to:

(a) ages of the candidates;

(b) sex differences;

(c) geographical differences;

(d) performance of pupils from elementary and secondary schools;

(e) the content of the tests, by factorial analysis of the correlations between them.

The test results and accompanying information were coded and punched on Powers' 36-column cards; it was possible, by this means, to do a great deal of sorting and cross-classification.

54. Bearing in mind the Department's desire to have as many tests as possible for future use, the construction of two more verbal batteries was proceeded with whenever the energies of the Unit's staff were not absorbed by an experiment immediately in hand. Then, too, it had been realized from the beginning that all Jamaican children of 11-plus could not be expected to have a common verbal facility arising out of common educational background. This implied that, in the population as a whole, and even in the highly selected population of secondary school entrance candidates, the verbal test was by no means an infallible measure of intelligence. This became almost depressingly obvious in experience with the tests and

the construction of non-verbal group tests of intelligence was embarked upon. This task proved so formidable, especially in its technical aspects of drawing and duplication, that it continued to occupy attention throughout the Unit's life.

55. The "Follow-up" experiment was prompted by a desire to assess the accuracy with which future success in a secondary school course could be predicted by the E R U tests at the age of 11 to 12 plus. Secondly, to obtain an estimate of the validity of the tests, it was desired to correlate test results with teachers' assessments of the pupils' ability. Thirdly, an estimate of the reliability of the tests was sought by re-testing the same pupils after the lapse of an interval of time and by comparing their performance on both occasions. Finally, the secondary schools were not obliged to use the Local Scholarship Examination at all whether for the award of scholarships or for selection and those schools which did use it, instead of conducting their own examination, were not obliged to base their admissions on its results. It became a matter of interest, therefore, to know how well fitted for secondary education were those pupils who did receive it; and also to what extent pupils, whose aptitude warranted secondary education, failed to get it. It must be remembered, in this latter regard, that not all pupils suited for secondary education were candidates for admission; the additional factors of ability to pay fees and limitation of the number of scholarships available precluded this in many instances. An answer to these and other questions was sought in the follow-up experiment, which was conducted in all grant-aided secondary schools at the beginning of 1949 among new entrants. Using the teachers' assessments, an interim report/

report on this experiment was prepared and circulated to heads of all secondary schools as guidance in interpreting the results of the Local Scholarship Examination in September 1949. Taking success in the Cambridge School Certificate examination as a criterion of success in a secondary school course, this experiment cannot be completed until about 1954.

56. The "Scholarship Candidate Inquiry", was a parallel investigation into the fate of the unsuccessful candidates in the Local Scholarship Examination of 1948. The aim was to establish how many of the 1948 candidates

(a) entered grant-aided secondary schools;

(b) entered private secondary schools;

(c) attempted the Scholarship Examination in 1949;

(d) thereafter entered secondary schools.

By inspection of the test performance of these groups of candidates, it was hoped to ascertain how many children, who were both fitted to receive secondary education and anxious to have it, failed in their objective, whether through grant-aided or private schools. To this extent the Island is failing to realize its potential human resources. As the inquiry had to be made by questionnaires, not all of which reached their addresses or were returned if they did, it is doubtful whether the results will achieve any great degree of accuracy.

57 The "Jamaica Educational Survey" was conducted in June 1949 with three main objects:

(a) to standardize the second battery of tests on a random sample of 2400 pupils in 50 schools prior to their use in the Local Scholarship Examination, 1949;

(b) to make a survey of the same random sample under the following headings:

(i) School background;

(ii) Home background

(ii) Home background;

(iii) Physical measurements;

(iv) Personal preferences, interests, activities etc.

(c) to investigate the relation between (a) and (b) and also between the several aspects of (b). The Director co-operated by putting all inspectors and assistant inspectors at the disposal of the Research Officer as well as the staffs and pupils of all the schools involved. The information under (b) was collected by means of questionnaires of three kinds. One of these was completed by each pupil and the other two by the Head. These last represented a considerable amount of work for the Heads. To their very great credit, this was done with care and accuracy and they went to a great deal of trouble to secure the information, making visits to the pupils' homes in very many instances.

58 In the Local Scholarship Examination, in September 1949, it was intended to use the second battery of tests which had been standardized for this purpose in the Jamaica Survey. However, the printers again defaulted and, at considerable inconvenience both to the Department and the Unit, Battery 1 was used a second time. On this occasion the General Knowledge and Essay papers were discontinued. Again, the Unit undertook a share in the organization and conduct of the examination and the supervision of the marking of scripts and conversion of raw scores. The results and data were again punched on Powers' cards with a view to confirming the findings of the 1948 analysis and of detecting any significant changes.

59. The standarization of Battery 2 showed that the distribution of raw scores was markedly skewed, in spite of the most careful precautions taken, in the test construction, to produce tests that would yield a rectangular distribution/

distribution of scores. The chief reason was believed to be the fact that the sample of children who worked the drafts was not sufficiently representative, being of too high average ability. There were probably other factors, consideration of three of which prompted the "PIE" (Practice-Incentive-Experience) experiment.

60. The Non-verbal Experiment was incidental to the construction of the non-verbal intelligence tests. The scores in the non-verbal sub-tests were punched on Powers' cards and correlated. They were also correlated with scores in a verbal battery administered to the same pupils. A factorial analysis of this very large matrix of correlation coefficients, should prove of interest in illustrating what factors emerge from such analysis, in which only non-verbal tests appear or in which they predominate.

61. Finally, the West Indies Survey, 1950, was undertaken, to extend the research outside of Jamaica to those colonies wishing to participate. It was along lines similar to the Jamaican Survey, 1949, modified in the light of experience of the earlier survey. The colonies which participated were British Honduras, the Bahamas, Leeward Islands, St. Lucia, Jamaica and the Cayman Islands.

62. Battery 3 was completed and printed before the Unit closed but it had not been standardized. It was left to the Department to arrange the administration of these tests to a random sample, worked out by the Research Officer, and then to mark these scripts. The Research Officer has undertaken to perform the statistical work of standardization on receiving the score distributions.

63. One other experiment was planned but had to be/

be abandoned for lack of time to do the testing; this concerned the problem of selection for technical education and it had been hoped to extend this to include vocational and agricultural training, as provided by the Practical Training Centres and the School of Agriculture. The Supervisor of the Industrial School at Stony Hill had repeatedly pressed for assistance, in carrying on his work along diagnostic and remedial lines, but, beneficial as this would undoubtedly have been, it was quite impossible to undertake it in the time available. Several Heads expressed their desire for tests that would assist them in grading their pupils quickly while another need, often mentioned, was for tests that would diagnose specific weaknesses within subjects.

64. An article, written by the Research Officer, for the Education Department's periodical, "THE TORCH", describing the research of the Unit for the special benefit of teachers, appears as Appendix. I, page 125.

PART II

CONSTRUCTION OF TESTS

PART II - CONSTRUCTION OF TESTS

Chapter 5 11+ Verbal Tests of Intelligence and Attainment.

A. Construction of drafts.

65. Several hundred intelligence test items of traditional types were composed. From these a preliminary selection of 425 items was made, chiefly on the basis of a subjective estimate of the ability of 11+ children, and several obviously ambiguous questions were discarded or modified. A great deal of attention was also given at this stage to the wording and presentation of the instructions for solving the items. The selected items were then compiled into four drafts each containing over 100 items. In similar manner four drafts of English and Arithmetic items were also constructed containing in all 486 English items and 400 Arithmetic items. A peculiar problem arose in connection with items designed to test English pronunciation. This was occasioned by the almost universal mispronunciation, according to standards accepted by the Oxford English Dictionary, of certain vowel sounds, by pupils and their teachers alike. Notable among these was the pronunciation of 'pear' as 'peer'. Following a good deal of discussion as to whether such a pronunciation had any claim to be "right" by virtue of common usage, further debate was suspended by compromise and such items were excluded as being "ambiguous". In Arithmetic the range was deliberately circumscribed, by the exclusion of such items as interest, proportion, volumes etc., to minimize the effects of coaching of favoured pupils. To a less extent the same principle was adopted in English by the exclusion, for instance, of formal grammar. Distances less than a mile are almost invariably described in chains in Jamaican speech. This prompted the inclusion of several items involving chains but it was subsequently discovered that this popular use is not by any means associated with a clear notion of what this unit of measurement comprises.

66. All drafts were reproduced on a Gestetner duplicating machine. Considerable attention was given to perfection of the printing especially in late stages when tests were being duplicated in final form. Thus it was not uncommon/

was not uncommon for a whole page to be discarded on account of imperfection in one letter and the format of pages was also carefully planned. Similar extreme precautions were also observed when assembling pages into booklets. The pages were checked ad nauseam, the edges of pages were carefully aligned when stapling etc., all these precautions being designed to made a child's score dependent solely on his ability to answer the items correctly and not on such chance factors as incorrect reading of a badly printed word, overlooking an alternative response, turning over two pages at once and so on. In all aspects of construction, administration, marking and standardization of tests, scrupulous care was taken to eliminate all such extraneous factors which may react unfavourably on a pupil's score and thus influence the whole trend of his future education.

B. Administration of drafts.

67. Each of the four batteries of drafts was administered to 220-250 pupils aged 11:6 to 12:5 inclusive. Since most children worked the drafts of two different batteries, a total of about 500 children was involved. This number could have been obtained in a few large schools but, in an attempt to make the sample of children approximately representative of the whole Island, small rural schools were included as well as larger schools, in more populous country places, and also secondary schools. Moreover, the 13 schools selected were distributed through four parishes together comprising about one-third of the whole Island. The schools and pupils involved are enumerated in Table 31 in Appendix 2 on page 153

68. In order to make possible fair comparison between items, it was essential that all children be given opportunity to attempt all questions. There was, therefore, no time limit for the drafts but the time taken by each child to complete all items in a draft was recorded in order to assess reasonable time limits for the tests in their final form. This made the administration of drafts extremely tedious, for some children might while away as long as three hours or even more on a task that the brightest finished easily in half-an-hour or less. Further, as there were only two really effective schooldays per week by reason of poor attendance/

poor attendance on Mondays and Thursdays and virtually no attendance on Fridays, this phase of work was unduly lengthy. Analysis of the time taken by pupils to complete drafts and of numbers of items attempted in specific times are given in Table 34 in Appendix 3 on page 156. In order to speed up the working of the drafts by tardy pupils, encouragement (but no assistance) to proceed with the task was freely given. As will later be described the large number of items worked correctly in response to such mild encouragement as "Carry on; do as many as you can" was a source of considerable error in the provisional standardization of the first battery of tests.

69. The effectiveness of the printed instructions for working the items was also examined during the administration of drafts by observation of, and discussion with, individual pupils and also by the kinds of questions asked by the children. Attitudes towards the task varied enormously. They ranged from diligence, rapidity and complete absorption to seemingly utter indifference and complete inactivity. To many, the sheer novelty of an individual exercise inspired them to greater industry than they were believed to be capable of by their teacher. To others, the novelty led them to do precisely nothing. One child having been observed to do nothing for fifteen minutes, was asked to read aloud the first item: "Write the letter that comes between R and T in the alpha-"bet." He did so and, without further prompting, immediately supplied the answer, wrote it in the proper place and proceeded with steady effort, to make a fair score on the rest of the draft. At the other extreme was the bright boy who demanded: "It says here that, if I understand "that I must work quickly and carefully, I must write B on this line. "But why?"

C. Selection of Items.

70. After marking, the worked scripts were separated into three categories (or "thirds"*) with equal numbers of children in each, on the basis/

* Actually the scripts were divided into six categories for a purpose subsequently described in constructing the vernier test but division into sixths was not essential at this stage.

basis of ability, using the "internal criterion" of total score on the draft as an estimate of ability. An answer pattern was then constructed and a facility (or difficulty) value and an efficiency (sometimes called item-validity) value were calculated for each item. The facility value (F) is simply the percentage of children answering the question correctly. The efficiency value (E_{13}) is a measure of the effectiveness of the item in discriminating between the brightest and the least able children. It is best expressed as

$$E_{13} = \frac{1_3 - 3_3}{1/3 N}$$

Where 1_3 is the number of children in the top (or 1st) third answering the item correctly,

3_3 is the number of children in the bottom (or 3rd) third answering the item correctly and

$1/3N$ is the number of children in each third, N being the total number of children in the sample.

In general, items answered correctly by more than 80% of all pupils were discarded as being too easy, though one or two of these may be included, especially in Arithmetic and English, by way of giving encouragement, especially to the least able pupils, and also to establish self-confidence. Similarly, items answered correctly by less than 20% of all pupils were discarded as being too difficult though many such difficult intelligence items were subsequently used for the construction of a "vernier" intelligence test. An efficiency value (E_{13}) of not less than 0.50 was usually demanded before items could pass for inclusion in a test though, since E_{13} values are depressed when F values ~~were~~ are either very high or very low, items of E_{13} as low as 0.40 were sometimes admitted. These standards were applied to attainment tests as well as to intelligence tests.

71. An ordinary test, designed to measure ability over the whole range of the population from the very highest to the very lowest, while well-suited for research and selection of pupils for admission to Secondary Schools, did not serve, as well as might be, the needs of the Education Department. The Department's especial aim was to award scholarships; for this purpose, a "vernier" test (called the Supplementary Test) was included in the battery. This test aimed at the maximum amount of discrimination within a narrow range of high ability.

The presence/

The presence of this test in the battery affords the further advantage of giving a second estimate of the pupil's intelligence. The simple sum of his scores in all four tests of the battery may be used as a single estimate of his all-round ability, equal weight being given to intelligence and school attainment. Thus, one avoids having recourse to the expedient, sometimes adopted, of doubling the intelligence quotient; this has the disadvantage of also doubling its error.

72. To select items for this type of test, a second efficiency value ($E_{12/6}$) was calculated for each of the items too difficult for inclusion in the ordinary test. These were calculated from the numbers of pupils "passing" the item in the upper and lower halves of the top third i.e. in the 1st and 2nd sixths. Thus:

$$E_{12/6} = \frac{1_6 - 2_6}{1/6N}$$

Where 1_6 is the number of children in the top (or 1st) sixth answering the item correctly,

2_6 is the number of children in the second sixth answering the item correctly, and

$1/6N$ is the number of children in each sixth.

Like the E_{13} value, $E_{12/6}$ has a possible effective range of 0 to +1 though negative values to -1 are theoretically possible and sometimes obtained. However, the maximum value of +1 is possible only when $F_{1/3}$ is exactly 50%, (where $F_{1/3}$ is the percentage of pupils passing the item in the 1st third only.) In practice, values for $E_{12/6}$ are lower than E_{13} chiefly because the middle third is left out of consideration in computing the latter value. Thus, the criterion of acceptance was an $E_{12/6}$ value of not less than 0.40 though one or two items, of very high or very low $F_{1/3}$, but of $E_{12/6}$ as low as 0.35, were included. $F_{1/3}$ values of selected items were kept within the 20% - 80% range.

D. Construction of Tests.

73. In assembling the selected items into the form of a test, regard was paid to the structure and balance of the test. The numbers of the several types of items included in each test are shown in Tables 35 and 36 in Appendix 4 on pages 157-8. The several aims governing the structure of the tests were/

were:

1. To include as many different kinds of items as possible and so give each child opportunity to excel in those types of items where he best can thus minimizing the element of luck.

2. For the same reason some questions of each kind are placed near the beginning to give each child as much encouragement as possible.

3. On the other hand, in Intelligence and English, a minimum number of items of each kind must be grouped together so that the time spent in reading and grasping instructions and examples may not be disproportionate to the time spent in actually answering the items.

4. Similarly, in fairness to all children, this number was kept fairly constant at 5 - 7.

5. While the items within a group (i.e. of one kind) are arranged in descending order of facility value, this order is avoided in the test as a whole lest the children, sensing that the items are becoming increasingly difficult, become discouraged and give up trying

6. There may be a departure from this aim at the very end of the test as only the more able children are likely to finish within the time limit and such children enjoy the extra effort required to solve the more difficult items which serve the added function of discriminating more effectively among the bright children.

74. At this stage, the instructions and examples were subjected to close scrutiny and considerable amendment. Using the minimum number of words, they were made as explicit and as free from ambiguity as possible in order to minimize the emphasis placed on the comprehension of the instructions and to place most emphasis on the ability to carry out these instructions. This was a difficult task because standard English is not the commonest medium of communication and the use of colloquialisms could not be admitted. A few devices which were adopted are mentioned:

1. Use of the simplest possible words even though they may not be the most apt e.g. "comes" vice "occurs" as in

"Which letter comes once in the word.....etc?"

Unfortunately there are no satisfactory substitutes for many essential words such as "alphabet", "opposite".

2. Achieving simplicity at risk of ambiguity as in omitting the word "immediately" from:

"Which letter comes (immediately) after R in the alphabet?"

3. The use of underlining, heavy type, capital letters and even frequent repetition to emphasize a part of the instructions commonly ignored, as in "Jumbled Words" where the last letter only of the word is to be written.

Other pupil/

Other pupil difficulties, observed during the administration of drafts, received attention. It was found that many of these could be mitigated by modifying the format of the tests in printing, such as the insertion of a solid line between groups of items on the same page, to avoid confusion between them. Little could be done, however, about the common failure to read instructions at all, apart from printing "Read every word "carefully" at the head of each page.

75. In the light of the time analyses constructed in the administration of drafts, the time allowed for each test of Battery 1 was fixed at 60 minutes (30 minutes for the short vernier test). This allotment created difficulties of maintaining order during the administration of the English and Intelligence Tests, as abler pupils finished in half the time or less and grew very restless. In Batteries 2 and 3 the times for Intelligence and English were reduced to 45 minutes but those for Arithmetic and the Vernier were not changed.

E. Administration of Tests.

76. One of the fundamental aims in constructing tests was to put them as tools into the hands of departmental personnel in the Caribbean. Moreover, most of the testing involved in the Unit's research was carried out by departmental officers, inspectors, supervising teachers and heads. When there was opportunity, talks were given, outlining the procedure and principles involved, such as at a conference of inspectors, a summer school for teachers and several less formal occasions. Though very valuable, these talks could not possibly reach all who were likely to be invited to take part in the future, still less than in the present, and printed instructions were clearly essential. Explicit instructions for administering ERU* Tests were carefully prepared and duplicated. Not only did these make possible the use of ERU Tests in departmental examinations, but they were also the means of carrying out a far greater number of experiments/

* ERU = Education Research Unit.

experiments than could possibly have been undertaken if all testing had had to be done by the Unit's own staff and at the Unit's expense. However, by far the most valuable result of this policy was that there is now a fairly large number of responsible people in several colonies, experienced in the administration of tests, who could conduct the field-work of future experiments while the design of the experiments and the subsequent analysis of the data could be done elsewhere. The organization of field staff has been most developed in Jamaica, where there are 18 Inspectors experienced in the administration of tests, while a senior officer at departmental headquarters has been charged with responsibility for organizing such work. There is also a senior officer with similar responsibility in British Honduras and both of these officers have had training in mental testing at the London Institute of Education.

77. The prepared instructions were:

1. General Instructions for Administering ERU Tests (See Appendix 5 pages 161-2). These include general instructions for the timing of tests, materials required, the return of scripts, the method of giving spoken instructions and other details concerning the general conduct of the testing. They are provided, not only to each supervisor in charge of the testing, but also in quantity for the invigilators assisting him.

2. Special Instructions for Administering ERU Tests (See Appendix 5 pages 163-5). These relate to the actual procedure of setting the children to work and contain the exact words of the spoken instructions that must be used in doing this; these words are printed in red for the convenience of supervisors. Together with the Special Instructions, each supervisor is provided with:

3. Cover page of each Test from which he is required to read aloud the printed instructions to the pupils.

4. Time and Script Record. (See Appendix 5 page 166) is a convenient sheet on which the supervisor records the times of the beginning, the end and the several stages of each test and also of the serial numbers of used and unused scripts.

5. Certificate of compliance with Instructions. (See Appendix 5 page 167). Each Supervisor is required to certify that he administered the tests in strict compliance with the instructions or else to report in what respects he deviated from these instructions.

6. Receipt for Materials etc. (See Appendix 5 page 167). This is simply a list of all the materials required for the proper administration of tests. It serves the double purpose of enabling the supervisor to check that he has received everything he needs and also of assuring the officer distributing these materials that this is the case.

F. Marking of Worked Scripts.

78. Except in the West Indies Survey, all marking was done by

temporary/

temporary ad hoc assistants under supervision at the Unit's headquarters. Apart from the duplication of answer keys (~~Appendix pages~~ Vol. 2.), with the answers conveniently spaced to fit the scripts, no other materials were required. Experience showed that the marking of objective tests is by no means as objective as is usually supposed, in spite of all precautions to this end. A careful record was kept of all ambiguous answers and, especially, ambiguous methods of indicating the right answers; and these were embodied at some length in printed "Instructions for Marking "ERU Tests" (Appendix 5 pages 168-173) which were prepared for use in the West Indies Survey. Reference to them, and especially to the specimen marked page of the worked script (p.173), will show to what extent subjective opinion can intrude into this task.

G. Standardization of ERU Tests.

79. Marking completed, a score distribution (See Appendix 6 page 174) must next be compiled showing the scores made by the children in each month group. This may then be used to standardize the test, provided that the test has been worked by the whole population of children of the same age, or by a random sample of it. ~~The method by which a~~ A random sample was chosen in Jamaica; ~~is described at length in chapter ;~~ in other colonies, the whole age-group was tested, except in British Honduras where the sample was not random. The method of standardization used is that devised by Dr. D. N. Lawley and in use at the University Department of Education at Moray House, Edinburgh (Br. Jour. Psych. (Statistical Section), Vol. , Part , pp. -). The process consists essentially of

1. Calculating a set of quotients equivalent to intervals of raw score (RS = 10, RS = 20, RS = 30, etc.) for a selected month group, preferably the youngest month group concerned, so that the quotients are normally distributed, with a standard deviation of 15, about a mean of 100;

2. Calculating the coefficient of the regression of quotient on age. This is simply an age allowance representing the difference between the quotients of two children who make the same raw score but whose ages differ by one month.

3. To calculate the quotients for other ages, it is merely necessary to subtract the age allowance (or regression coefficient) found in step (2) from the quotient-equivalents for the ~~for the~~ youngest month-group found in step (1).

The results/

The results of these calculations are embodied in the conversion table, having age and raw score on its margins and the corresponding quotients in the body of the table. Conversion of raw scores to quotients may then be performed, after slight training, by clerical assistants. Initially, the table showed raw score in 5-point intervals and intervening quotients were calculated by interpolation. Later tables gave every point of raw score. This involved much more labour in preparing the table but saved much time and error in conversion.

80. The construction of a battery of tests for use in the Jamaica Local Scholarship Examination of September, 1948, was undertaken only in May of that year. There was therefore sufficient time only for the administration of drafts, but not for the administration of the completed tests; and consequently standardization on a random sample was impossible. This made a provisional standardization necessary. The items for the tests of Battery 1 were deliberately chosen from Drafts A and B only. These drafts had both been worked by the same children. The scores they would have made in the tests, in their final form, were estimated as being the total of their success, in the draft stage, in those individual items of which the tests of Battery 1 were composed. On the basis of these hypothetical raw scores, the first step of the standardization, described in paragraph 79 (1), was performed. The age allowance, required for the second step of the process, was calculated from the scores actually obtained by the candidates in the Local Scholarship Examination. This method was adopted for all tests other than the Vernier Intelligence test (See paragraph 71). The performance of the pupils of the sample, in the individual items of this test, was so low as to make this method of standardigation quite out of the question. Instead, the raw scores of the LSE candidates in the ordinary Intelligence test were converted to quotients and a distribution of these quotients laid side by side with a distribution of the raw scores of the same candidates in the Vernier Test. On the assumption that the raw scores in both of the Intelligence tests (the ordinary and the Vernier) should correspond to the same intelligence quotients, the raw scores in the Vernier test were standardized against the quotients given by the ordinary Intelligence test/

test.

81. The age allowance thus computed was sufficiently accurate for the proper interpretation of the Scholarship Examination results which, at the time, was the most important requirement. However, the position of the mean quotient (100), estimated by this statistical makeshift, was subsequently found to be in error. It had been established much too high with the result that all quotients were considerably underestimated. The reasons for this error are presumed to include:

1. The sample of pupils who worked the drafts was not representative of the population, containing too high a proportion of secondary school pupils;

2. The greater absence among the less able pupils in the elementary schools had the further effect of spuriously increasing the mean ability of the elementary school pupils;

3. The drafts were administered without the time limit imposed in the tests and

4. All children, especially the less able, were deliberately encouraged to apply themselves to the task and to attempt all items in the drafts.

A proper standardization of Battery 1 on a truly random and more representative sample was made possible by the use of this battery in the West Indies Survey. This applies, not only to Jamaica, but to all the colonies who participated in this Survey. The total number of children aged 11:0 to 12:11 in all colonies was about 9000. The extent of the error is indicated in Table 3 which shows the equivalence between quotients derived from the provisional standardization and their approximate true value.

TABLE 3. ERROR IN PROVISIONAL STANDARDIZATION.

True Quotient	PROVISIONAL QUOTIENTS			
	Intelligence	Vernier	Arithmetic	English
135	130	132	117	122
130	118	118	112	115
125	113	111	105	110
115	96	98	95	94
100	77	-	85	82

Batteries 2 and 3 are being standardized only within Jamaica. Battery 2 was standardized, incidentally, in the Jamaica Survey in 1949. It was ready for/

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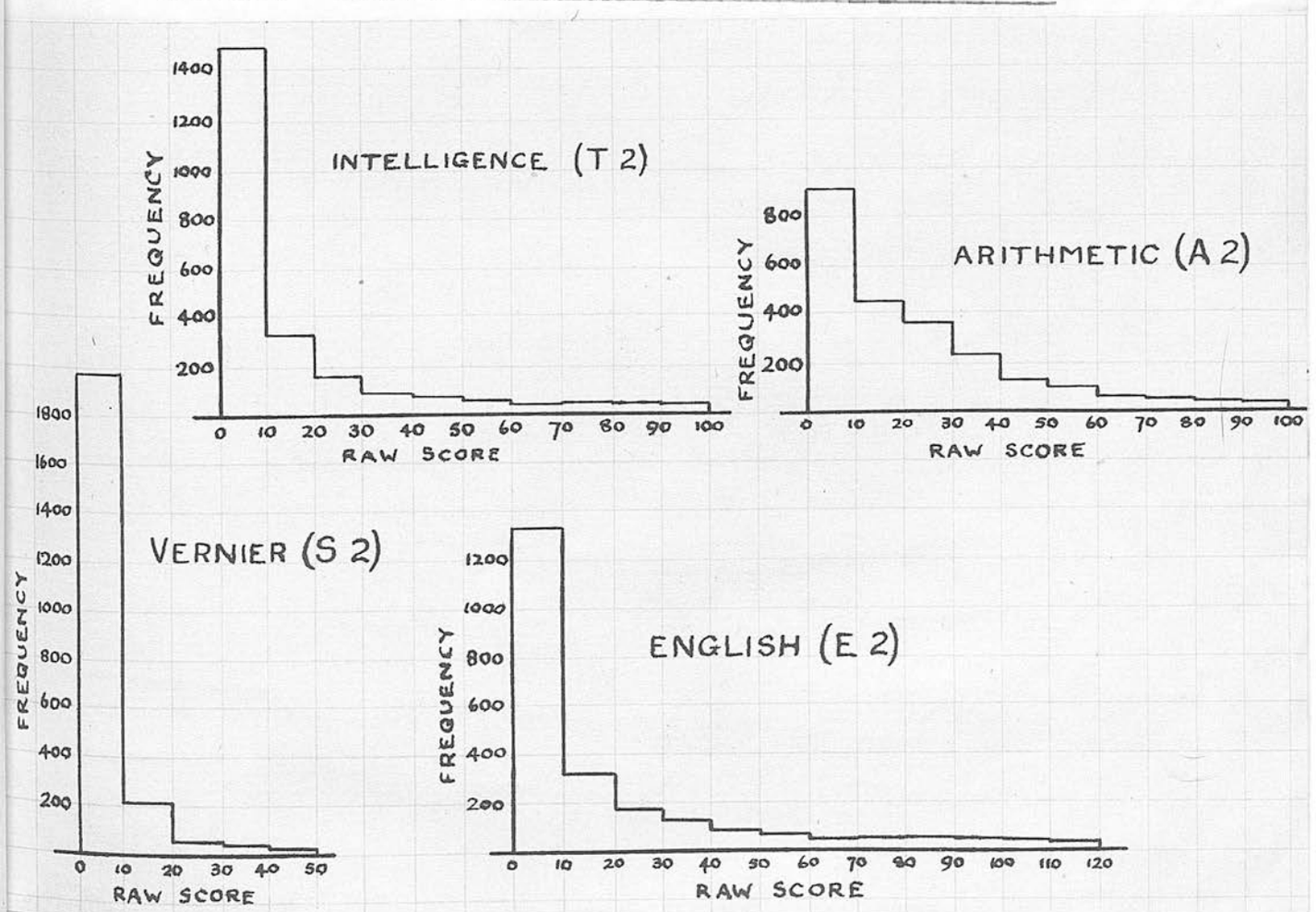
ready for use in the Local Scholarship Examination in 1950. The field-work of administering Battery 3 to a random sample, preliminary to standardizing it, is being undertaken by the Jamaica Department itself (see paragraph 76) for the express purpose of standardizing the battery for use in the Local Scholarship Examination in 1951. The Department will mark the scripts and compile the score distributions; the Research Officer has undertaken to do the subsequent statistical work.

82. Appendix 6 shows the distributions of raw score in the ~~four~~ Intelligence and English tests of ~~each of~~ Batteries ~~1 and~~ 2, obtained by the random samples of Jamaican pupils in ~~the West Indies Survey (1950) and~~ the Jamaica Survey (1949) ~~respectively~~ (See also Figures 1 and 2). The enormous size of the "tail" of the zero-scores in every test shows the extent of the error mentioned in paragraph 81. It also illustrates one of the major difficulties confronting psychological measurement in Jamaica, to wit, the large body of children in any year-group whose educational background is so scant, whose familiarity with an individual exercise of any kind is so neglible and indeed, whose dexterity with pencil on paper is so slight, that it is quite impossible to reach them with any kind of verbal/

FIGURE 2 SKEWNESS OF RAW SCORE DISTRIBUTION FOR BATTERY 2



verbal group test whatsoever. Further, it must be remembered that these score distributions include only children attending school. They do not include either those children on roll who were absent (half as many as those present) or those others who do not attend school at all (one in six of the whole population of like age).

83. A random sample of about 250 worked scripts of each of the four tests of Battery 2 was taken from the Jamaica Survey scripts; an answer pattern was prepared and the data of Table 4 calculated. The very low mean facility values reflect the extreme skewness of the distribution of raw scores illustrated in Figure 1 and the problem mentioned in the previous paragraph. With such low facility values the efficiency values are correspondingly low.

TABLE 4 RELIABILITY COEFFICIENTS ETC. OF TESTS OF BATTERY 2

	INTELLIGENCE	VERNIER INTELLIGENCE	ENGLISH	ARITHMETIC
Number of items	100	50	120	100
Number of Children	2328	2287	2283	2326
Standard deviation of Raw Score	20.31	6.96	25.87	21.32
Reliability coefficient	.9836	.9400	.9871	.9799
-do- (Age constant)	.9829	.9376	.9866	.9788
Standard error of quotient	1.96	3.75	1.74	2.18
Correlation of Raw Score with Age	.20	.20	.20	.22
Mean facility value	13.51	8.86	15.17	20.93
Mean efficiency value	.35	.23	.38	.43

Note the higher mean raw score in Arithmetic in the light of paragraph 12 (175) on page 117.

Chapter 6. 11+ Non-Verbal Tests of Intelligence.

84. In essence the construction of the non-verbal tests was the same as for the verbal tests. The pictorial material was of two kinds:

(a) Concrete, portraying such real familiar objects as buildings, animals, vehicles; and

(b) Abstract, in which the pictures were composed of lines, circles, dots, crosses, etc.

A total of 1204 items formed 16 sub-tests each administered separately. There were two different drafts of each sub-test and five of the sub-tests had both concrete and abstract forms. Each sub-test began with a few (usually 3) examples, which were fully explained, followed by a number (usually 7) practice items. ~~The composition of the sub-tests is detailed in Appendix page~~ . While the method of presentation of some types of items was designed anew, with the aim of making them more easily explained and understood, the items, with one exception, were such as commonly appear in familiar non-verbal tests. This one exception is described in a note written for the British Journal of Psychology appearing as Appendix I, page 132.

85. The formidable task of drawing and duplicating the items, involving more than 7200 individual drawings, was accomplished with the aid of a "BandA" duplicating machine which lends itself very well to this purpose. The Gestetner, or other machine using stencils, is not at all suitable unless the stencils be prepared photographically, in which case this method is to be preferred as a greater number of copies can be obtained from the one original. The limitation of the "BandA" to 200 copies meant that the copies of the drafts had to be used repeatedly. The pupils recorded their answers on separate answer sheets against the appropriate item-numbers. This practice is far from desirable and cannot be admitted in the tests in their final form, as it defeats one of the aims of the non-verbal tests which is to exclude the use of printed letters and numbers as being unintelligible to the child who has never attended school. It also introduces a source of error occasioned by the recording of the correct answer in the wrong place, which should not be allowed to affect the test score.

86. The chief difficulty associated with the administration of the non-verbal/

non-verbal tests arose out of the need to give explanations and instructions without the assistance of the printed word. To a greater extent than in the verbal tests, the children's unfamiliarity with standard English hindered their ready grasp of the task. Free use of colloquial speech would no doubt have facilitated their understanding but it would have been impossible to prepare a standard form of such instructions and not at all desirable. To compensate for this difficulty, not only were the simple examples explained in great detail, but the children's own working of the examples, and of the practice problems which followed, were more closely supervised by invigilators than was customary in verbal tests.

87. The drafts were administered to children, aged 11+, in 18 schools situated in 5 western parishes. In addition to elementary and secondary schools, a few pupils from a private preparatory school were included. The schools included are listed in Table 32 in Appendix 2 page 154. The drafts were administered without time limit. After the initial uncertainty, due to the unfamiliar nature of the task, the pupils speeded up considerably and, in general, were completely absorbed by the work. Even so, the dogged persistence of some of the slower pupils, added to the disproportionate length of time occupied by the giving of instructions, contrived to make the administration a lengthy process.

88. The subsequent work of constructing the test in final form was the same as for the verbal tests and need not be fully described again save by reference to Table 38 Appendix 4 page 160 where the composition of one non-verbal test, composed of "concrete" items is shown. This is the only non-verbal test so far constructed; there is material for the construction of others but more work on it must first be done. As there has been no opportunity to administer this test to a random sample of a group, year, this test has not yet been standardized. The test consists of 80 items, comprising ten of each of eight different kinds. With the two exceptions of "Analogies" and "Opposites", all kinds call for 2- response answers. Except in "Pairs", the two responses to each item may be scored independently of one another or the item may be marked correct only if both responses/

responses are correct. The mean facility and efficiency values of the items corresponding to both methods of marking are shown in Appendix 4 . It is intended to make two separate standardizations of this test corresponding to the two different methods of scoring. In this way it is hoped to extend the range of the test to meet, to some extent, the difficulty mentioned in paragraph 82 i.e. to allow reasonable discrimination between pupils at both extremes of the very wide range of ability.

PART III

JAMAICA LOCAL SCHOLARSHIP EXAMINATION

PART III. JAMAICA LOCAL SCHOLARSHIP EXAMINATION

Chapter 8. Function of the Examination.

92. The Local Scholarship Examination was initially an administrative attempt to bring unity and coherence into a system that had become confused and unmanageable through lack of co-ordination. Before the institution of grants-in-aid, the several secondary schools were quite independent of one another and, with the exception of the two Government maintained schools, of the central education authority; each school conducted its own examination for the award of any scholarships it had to offer and, when it considered necessary, for selecting pupils for admission. In addition, there were a few trusts, independent of schools, which had scholarships to offer; these too, necessitated examinations. As the number of scholarships increased, especially with the coming of government aid, such examinations became more of a necessity and less of a formality, though admissions were still not necessarily contingent on success in an entrance examination. This multiplicity of scholarship examinations presented an impossible situation to the candidate who, dependent on some form of aid for his secondary schooling, wished to try for two or three alternative scholarships in case he failed to obtain that one he chiefly preferred. By no means the least difficult aspect was the travelling about the Island from one place of examination to another.

93. In addition to the several examinations conducted by the schools, it was necessary for both the Education Department and the Schools Commission to conduct examinations for the award of Statutory Scholarships. The solution offered by the Department was to conduct, and finance, one examination only which the schools and trusts were invited to use in place of their own. Candidates thus took one examination only, they took it at a centre located in their own parish and, in sitting this one examination, could be considered as candidates for as many different awards as they were eligible. The schools and trusts benefited by being relieved of conducting their own examination, by having an examination that was, perhaps, better than they themselves could devise and by having a uniform/

uniform standard which enabled them to make direct comparisons between the performance of different pupils irrespective of where they sat the examination. The central authority, while adding to its responsibilities only slightly, since it had to conduct an examination in any case, derived the satisfaction that entry of a deserving candidate to a secondary school by scholarship was more certain than formerly. By 1948, two trusts and 14 out of 25 schools were using the departmental examination. The schools were not, and still are not, obliged to use the examination either for awarding scholarships or as an entrance examination.

94. By 1948, there were 699 scholarships, of varying value, currently in force in the secondary schools; of these, 95 carried full board as well as tuition and 53 more granted part board in addition to tuition. Free tuition only was provided in 449 cases while 102 others carried assistance towards tuition. 73 scholarships*, carrying full board and tuition, were provided by Government; they were of two kinds. "Code" scholarships are provided under the Primary Education Act, are available without restriction to all children, aged 11 to 12+, in elementary schools, and are tenable for two years in the first instance with possible extension to four and even five years; their award is the responsibility of the Education Department. "Unprovided Area" scholarships are similar but are restricted to children resident in the four parishes of St. Thomas, St. Mary, Trelawny and Clarendon (excluding the district of Vere) which have no grant-aided secondary schools or scholarships. The schools themselves provide varying numbers of scholarships, none in some cases, sustained by trusts or endowments and sometimes private benefactions. In addition, and this provides the majority of scholarships carrying free tuition only, each school is required to provide "Grant Places" equivalent in total value to not less than 20% and not more than 33 1/3% of the annual grant-in-aid from public funds. Finally, there are the scholarships provided by trusts that have no schools. The Vere Trust is one of these and accounts for the exclusion of Vere from the unprovided areas mentioned above.

95. The Secondary Education Continuation Committee, reporting its consideration/

* Included in the totals of 699 and 95 mentioned above.

consideration of the recommendations of the Kandel Committee, advised increase in the number of all scholarships, except those for unprovided areas. It also urged the introduction of new scholarships for elementary school pupils aged 13 and over and "transfer" scholarships to facilitate transfer, at age 13 and over, of pupils from one school to another better suited to their individual abilities. The first of these recommendations can be met by the Local Scholarship Examination as it is now conducted and will involve only an increase in numbers. But the second recommendation involves a change in the examination which is at present devised to test candidates up to the age of 12:11 but not at age 13 and over. It is admitted that assessment of the ability of candidates of 13+ can be, and has been, made on the examination as it now exists but it must be recognized that accuracy of assessment declines at these upper ages. For the award of these scholarships, of considerable value in some instances, new tests would have to be constructed that would give greater precision at higher ages especially if the awards are to depend, in the last analysis, on performance in the Local Scholarship Examination.

96. The part undertaken by the Research Unit in preparation for, and the conduct of, the Local Scholarship Examination in September 1948 and again in 1949 has already been described (See paragraphs 49-52). The construction of the battery of tests was described in chapter 5 (See paragraph 65-75). Details of the administration and marking of the tests were given in paragraphs 76-78 while the method adopted to standardize the results appears in paragraphs 79-81. The tests themselves appear in Volume 2 while the score distribution for the ~~four~~ Supplementary and Arithmetic tests appear in ~~Table 13~~ Appendix 6, pages 176 and 177.

97. In 1948, 1149 candidates entered for the examination; 999 of these attended. The majority of these fell between the age limits 10:8 to 12:7 on the day of the examination but other ages ranged down to 9:0 (there was one candidate aged 7:4) and up to 13:6 (with one exception at 13:11). There were 15 centres arranged, one in each of the 14 parishes with an extra one in Kingston on account of the large number of candidates. The Research Officer asked that a second centre be established in St. Andrew for the same reason but both were held in the same school. The smallest country centre had 8 candidates and the largest 122. Although there was/

there was at least one centre in each parish, yet many of the candidates had considerable distances to travel, necessitating a very early start on the journey as communication is difficult in many country parts. An inspector of schools presided at each centre and was assisted by at least one invigilator. At the request of the Research Officer an additional invigilator was provided for every 30 candidates.

Chapter 9. LSE/48: The Candidates - Their Number, Source, Age and Score

98. Numbers of Candidates. Table 5 presents an analysis of the number of boys and girls who took the examination, and also the parishes in which they were living. The age limits, 10:8 to 12:7 at the date of the examination, correspond to the official age limits, 11:0 to 12:11, on the 31st of December. The "expected numbers of candidates (f_e)" are computed by distributing the total of 370 boys (or 535 girls) among the parishes in proportion to the average attendance at elementary schools during 1947. (The attendance at secondary schools was not included as many pupils of secondary schools are drawn from parishes other than that in which the school is situated. The number of secondary school pupils is proportionately small in any case.) The differences between the observed and expected frequencies give a value of chi-squared corresponding to an infinitessimally small probability value. The variation in numbers of candidates from parish to parish can best be appreciated from the row in which the LSE/48 candidates are expressed as per-milles of the 1947 average attendance. The following comments may be made:

1. The numbers of pupils taking the LSE was proportionately far greater in Kingston, St. Andrew and St. James than in any other parishes.

2. Since more than half of the candidates in St. James were residents of Montego Bay while nearly 90% of those in St. Andrew lived in the suburbs of Kingston, far more urban than rural children took the examination.

3. Examination of the lists of candidates shows that the majority of the country pupils came from the larger villages or towns.

4. The candidates in five parishes of St. Thomas, Portland, St. Ann, Hanover and St. Catherine were markedly fewer, by proportion, than in other parishes. It is strange that one of these, St. Thomas, is an "unprovided area." St. Elizabeth was lowest of all as it also was in literacy and percentage of school attendance, according to the Census.

5. It is significant that the order of parishes,

Notes: 1. Apparent discrepancies in totals due to approximation to one decimal place.
2. ++ and -- imply that the individual contribution to chi-squared exceeds/[illegible] corresponding to P = .05
3. A blank space implies that the difference is so slight as to be negligible.

TABLE 54. NUMBERS OF CANDIDATES BY PARISHES IN LSE/48

	Parish	King-ston	St. Andw	St. Thos.	Port-land	St. Mary	St. Ann	Trel-awny	St. Jas.	Han-over	West-m'ld.	St. Eliz.	Man-ch'r.	Clar-endon	St. Cath.	Island
	Average Att'ce. All ages. Elem. Schools only. 1947	11143	7542	5380	6124	9037	10583	5305	6381	5584	8779	10704	10060	11638	11231	119491
BOYS	LSE Candidates 10:8 - 12:7 (f_o)	90	64	4	7	20	12	18	56	8	24	4	24	26	13	370
BOYS	Expected number of candidates (f_e)	34.5	23.4	16.7	19.0	28.0	32.8	16.4	19.8	17.3	27.2	33.1	31.2	36.0	34.8	370.0
BOYS	Contribution to chi-squ'd. $\frac{(f_o - f_e)^2}{f_e}$	89.3	70.8	9.62	7.5	2.3	13.2	0.2	66.5	5.0	0.4	25.6	1.6	2.8	13.6	308.3 P<.001
BOYS	Size and direction of difference ($f_o - f_e$)	++	++	-	-		-		++	-		--			-	
BOYS	LSE/48 as ‰ of Av.att'ce.in 1947	8.1	8.5	0.7	1.1	2.2	1.1	3.4	8.8	1.4	2.7	0.4	2.4	2.2	1.2	3.1
GIRLS	LSE candidates 10:8 - 12:7 (f_o)	142	79	12	14	38	14	16	47	6	38	14	39	48	28	535
GIRLS	Expected number of candidates (f_e)	49.9	33.8	24.1	27.4	40.5	47.4	23.8	28.6	25.0	39.3	47.9	45.0	52.1	50.3	525.0
GIRLS	Contribution to chi-squ'd. $\frac{(f_o - f_e)^2}{f_e}$	170.1	60.6	6.1	6.6	0.2	23.5	2.5	11.9	14.4	0.0	24.0	0.8	0.3	9.9	330.9 P<.001
GIRLS	Size and direction of difference ($f_o - f_e$)	++	++	-	-	--		+	-		--				-	
GIRLS	LSE/48 as ‰ of Av.att'ce in 1947	12.7	10.5	2.2	2.3	4.2	1.3	3.0	7.4	1.1	4.3	1.3	3.9	4.1	2.5	4.5

TABLE 6. PARISHES IN ORDER OF LITERACY, SCHOOL ATTENDANCE AND NUMBERS OF CANDIDATES FOR LOCAL SCHOLARSHIP EXAMINATION 1948

	LITERACY	%		SCHOOL ATTENDANCE	%		CANDIDATES FOR LSE/48	‰
1	Kingston	91.6	1	Kingston	94.6	1	Kingston	20.8
2	St.Andrew	87.6	2	St.Andrew	88.7	2	St.Andrew	19.0
3	Portland	79.2	3	Portland	85.7			
4	St.Thomas	74.8	4	St.Thomas	84.3			
5	St.James	74.4	5	St.James	82.3	3	St.James	16.2
6	Manchester	72.7				4	Westmoreland	7.0
7	St.Mary	72.3	6	St.Mary	80.8	5	St.Mary	6.4
8	Hanover	71.2	7	Hanover	80.3	6	Trelawny	6.4
9	St.Ann	70.8	8	St.Ann	79.9			
			9	Manchester	79.2	7	Manchester	6.3
						8	Clarendon	6.3
10	St.Catherine	69.5	10	St.Catherine	77.8	9	St.Catherine	3.7
11	Westmoreland	67.9				10	Portland	3.4
12	Clarendon	67.1	11	Clarendon	77.5	11	St.Thomas	2.9
13	Trelawny	67.1	12	Trelawny	76.1	12	Hanover	2.5
			13	Westmoreland	75.2	13	St.Ann	2.4
14	St.Elizabeth	65.4	14	St.Elizabeth	72.9	14	St.Elizabeth	1.7

based on number of candidates for LSE, resembles the orders based on literacy and school attendance. Table 6 illustrates this. It will be observed that three of the four "unprovided areas", St. Mary, Trelawny and Clarendon, stand higher in the third column than in Columns 1 and 2.

99. There were nearly 50% more girls than boys in the Island who took the examination; but this did not apply in Trelawny, St. James and Hanover. This excess of girls over boys is greater than could be ascribed either to the greater enrolment or to the more regular attendance of girls. The percentages shown in Table 7 support this. The percentages shown in the table for the total awards made are not dependable as they are based on returns from only 20 out of 26 secondary schools. Two of the other six were boys' schools but only one was a girls' school; three were mixed. Some

awards/

awards, such as to children of clergymen, were omitted.

TABLE 7. NUMBERS OF BOYS AND GIRLS COMPARED

	PERCENTAGE OF BOYS	PERCENTAGE OF GIRLS
School-age population, 7-14 (1943)	50.2	49.8
School enrolment at the end of 1942	48.9	51.1
Actually attending at the end of 1942	48.2	51.8
Scholarship candidates, 1948	40.9	59.1
Total awards made	36.4	63.6

100. Table 8 shows the source of the candidates. It is clear that the preponderance of girls comes from the elementary schools which sent 80% more girls than boys to the examination. This excess completely masks the excess of boys over girls presented by the aided secondary schools. One-fifth of all candidates were already attending secondary schools but not all awards are open to such candidates. Of the elementary school candidates, 70% were in Standard 6, 25% in Standard 5 and 5% in Standard 4. Four pupils were still in Standard 3. The candidates from the several kinds of schools, detailed in Table 8, were distributed disproportionately among the fourteen parishes. Table 9 shows the percentage distribution of candidates by schools and by parishes of residence for boys and girls separately. The last row shows the percentage of all candidates who were already attending grant-aided secondary schools at the time of taking the examinations; this applies to one-third of all candidates in Manchester and more than 20% in St. Andrew, St. Catherine and St. James. The lowest percentages (less than 5%) were in Portland, St. Elizabeth, Clarendon and

/Westmoreland/

TABLE 8. SOURCE OF CANDIDATES IN LSE/48

	Element-ary schools	Aided second-ary schools	Private Second-ary schools	Private element-ary schools	Private tuition	Total
Boys	252(62.1)	93(22.9)	20(4.9)	35(8.6)	6(1.5)	406 (100%)
Girls	454(77.3)	69(11.8)	22(3.7)	39(6.6)	3(0.5)	587 (100%)
Total	706(71.1)	162(16.3)	42(4.2)	74(7.5)	9(0.9)	993 (100%)

Westmoreland. In addition, there were small proportions of candidates from private secondary schools, chiefly in St. Andrew and Kingston.

101. The extent to which the Local Scholarship Examination is used by the schools for selection purposes is suggested by the fact that 999 children took the examination in 1948 but 1101 new pupils were admitted to all secondary schools in January 1949; of these, 215 had taken the Local Scholarship Examination. The chief objection to using the LSE as an entrance examination is that it is held in September for admission in January. Some schools conduct their own examination for selecting new pupils, but one Head Master, after having three children appear to take such an examination, conducted a second at which eight candidates attended. His annual admissions were about twenty.

102. Ages of Candidates. Paragraph 97 above refers to those candidates whose ages lay without the range 10:8 to 12:7. They were fewer in number than those within these limits as most available awards were subject to this restriction. But the mere fact that there were candidates older and younger than this 2-year range illustrates the "strain" put on the tests used of covering such a wide age range. Table 10 shows the distribution of age, by months, within the 10:8 to 12:7 range. It is self-evident, even without applying a statistical test, that the distribution differs significantly from a rectangular distribution. This is

confirmed/

TABLE 9 PERCENTAGE DISTRIBUTION OF LOCAL SCHOLARSHIP CANDIDATES BY SEXES, BY SCHOOLS AND BY PARISHES

	King-ston	St. And.	St. Thos.	Port-land	St. Mary	St. Ann	Trel-awny	St. Jas.	Han-over	West-m'ld.	St. Eliz.	Man-ch'r.	Clar-endon	St. Cath.	Island
Public Elementary	47.6 (71.1)	36.6 (55.0)	80.0 (84.6)	90.0 (100.0)	85.7 (88.1)	84.6 (75.0)	89.5 (94.4)	67.8 (79.6)	77.8 (100.0)	82.1 (83.7)	100.0 (89.5)	48.1 (78.0)	92.6 (98.0)	61.5 (69.7)	62.3 (77.4)
Grant-aided Secondary	24.3 (9.9)	31.0 (26.3)	20.0 -	10.0 -	14.3 (7.1)	7.7 (6.3)	10.5 -	26.8 (18.5)	22.2 -	3.6 -	- (5.3)	51.9 (22.0)	7.4 (2.0)	30.8 (24.2)	22.8 (11.7)
Private Secondary	6.8 (7.9)	15.5 (3.8)	- (15.4)	- -	- (2.4)	7.7 (12.5)	- -	1.8 (1.9)	- -	- -	- -	- -	- -	- (3.0)	4.9 (3.7)
Other Private	21.3 (11.2)	16.9 (15.0)	- -	- -	- (2.4)	- (6.3)	- (5.6)	3.6 -	- -	14.3 (16.3)	- (5.3)	- -	- -	7.7 (3.0)	10.0 (7.1)
% Secondary (Grant aided) Boys & Girls	15.7	28.5	5.6	4.0	9.5	6.9	5.4	22.7	13.3	1.3	4.0	33.8	3.9	26.1	16.3

Boys: upper entries.
Girls: lower entries in brackets.

Other private: private elementary schools and private tuition.

confirmed by a value of 89.76 for chi-squared for which P

TABLE 10. AGE DISTRIBUTION BY MONTHS

Age on 31st Dec. 1948	Month of birth	Number of Candidates	Deviation from Average (37.7)	Chi-squared
12:11	Jan. 1936	46	8.3	1.82
12:10	Feb. 1936	38	0.3	0.00
12:9	Mar. 1936	52	14.3	5.42
12:8	Apr. 1936	52	14.3	5.42
12:7	May 1936	54	16.3	7.04
12:6	Jun. 1936	50	12.3	4.01
12:5	Jul. 1936	55	17.3	7.93
12:4	Aug. 1936	44	6.3	1.05
12:3	Sep. 1936	42	4.3	0.49
12:2	Oct. 1936	46	8.3	1.82
12:1	Nov. 1936	34	-3.7	0.36
12:0	Dec. 1936	44	6.3	1.05
11:11	Jan. 1937	50	12.3	4.01
11:10	Feb. 1937	40	2.3	0.14
11:9	Mar. 1937	26	-11.7	3.64
11:8	Apr. 1937	36	- 1.7	0.08
11:7	May 1937	30	- 7.7	1.58
11:6	Jun. 1937	31	- 6.7	1.19
11:5	Jul. 1937	28	- 9.7	2.50
11:4	Aug . 1937	29	- 8.7	2.01
11:3	Sep. 1937	20	-17.7	8.32
11:2	Oct. 1937	28	- 9.7	2.50
11:1	Nov. 1937	14	-23.7	14.91
11:0	Dec. 1937	16	-21.7	12.50
		905		89.76

is much less than .001. The inference is that children are, in general, not availing themselves of both opportunities .

to take/

to take this examination but, losing the opportunity at 11+ , enter once only at 12+. Consequently, the mean age of all candidates is 12 years 1.36 months (on 31st December) instead of 11 years 11.50 months for a rectangular distribution. There were 348 candidates at 11+ and 557 at 12+, the latter comprising 61.5% of the total.

103. Giving rise to much greater concern is the fact that the age distribution is not rectangular within each year group; Table 11 illustrates this. This shows that, while

TABLE 11. AGE DISTRIBUTION WITHIN YEAR-GROUPS

Month of birth (1936 or 1937)	Number of Candidates	Deviation from Average (75.4)
January	96	20.6
February	78	2.6
March	78	2.6
April	88	12.6
May	84	8.6
June	81	5.6
July	83	7.6
August	73	-2.4
September	62	-13.4
October	74	- 1.4
November	48	- 27.4
December	60	- 15.4
	905	

Chi-squared = 25.66 $P < .01$

there is a tendency for some children to lose one opportunity to take the examination, there is a further tendency for some children to be deprived of both opportunities for no other reason than that they were born in the later

months/

months of the year. Since there is no reason to suppose that children born in the latter half of a year are less intelligent or capable than those born in the first half, one can only suppose that teachers fail to detect potential ability in the younger pupils or mistake the greater attainment of their older pupils for greater potential ability.

104. Table 12 shows the mean "official" ages (i.e. ages at December 1948) of candidates from the several parishes.

TABLE 12. MEAN AGES OF LSE/48 CANDIDATES BY PARISHES

Parish	Kingston	St. And.	St. Thos.	Portland	St. Mary	St. Ann	Trelawny
Mean age on 31st Dec.1948	12:2	12:0	12:1	12:4	12:1	12:2	12:2

Parish	St. Jas.	Hanover	West'mld.	St. Eliz.	Manch'r.	Clarendon	St. Cath.	Island
Mean age	12:2	12:1	12:1	12:1	12:2	12:1	12:0	12:1·36

Ages in years and completed months; Island mean to 2 decimals

TABLE 13. ANALYSIS OF VARIANCE OF AGE

Category	df	SS	MS	F
Between parishes	13	582	44.78	1.10 NS
Within parishes	891	36308	40.75	
Total	904	36890		

NS = not significant at 5% level.

105. Score Distributions. Table 14 shows the results of the examination in terms of percentages of the total number of candidates, of all ages, falling below the corresponding levels of raw score. For purposes of comparison, the distributions for the hypothetical sample (paragraph 80) and for the random sample of 2228 Jamaican children included in the West Indies Survey, 1950, (paragraph 61) are also included. It is at once evident that the LSE candidates were very highly selected, 25% of them being placed in the highest

10-20 points/

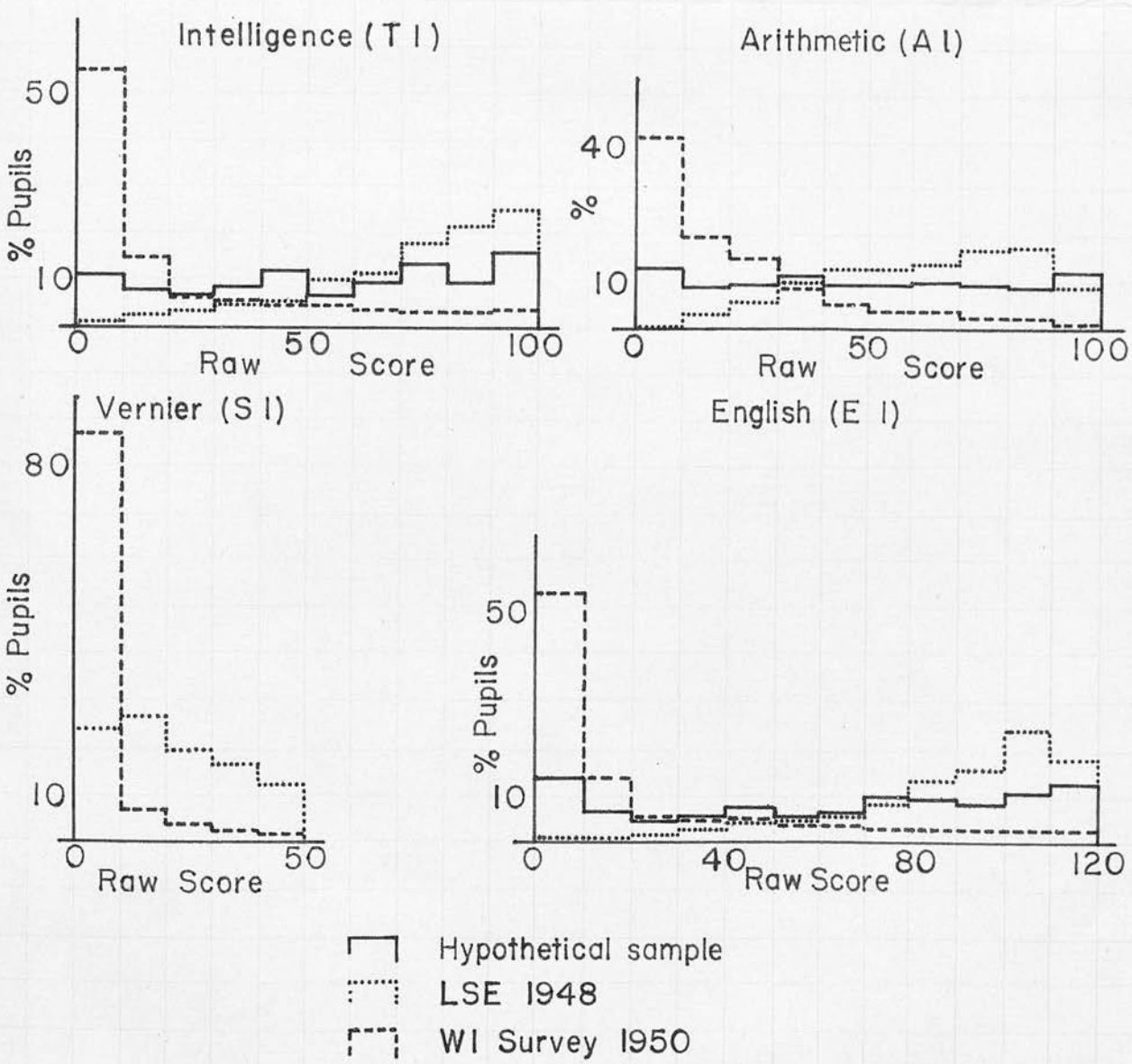
TABLE 14. SCORE DISTRIBUTIONS FOR BATTERY 1 TESTS OF (a) HYPOTHETICAL SAMPLE, (b) LOCAL SCHOLARSHIP EXAMINATION CANDIDATES, 1948, AND (c) WEST INDIES SURVEY JAMAICA RANDOM SAMPLE, 1950.

~~Raw Score~~	~~Intelligence~~			~~Intelligence~~		~~Arithmetica~~					
Raw Score	Intelligence (Maximum 100)			Vernier Intelligence (Maximum 50)		Arithmetic (Maximum 100)			English (Maximum 120)		
119(120)									(100.0)	100.0	(100.0)
109									(86.9)	82.2	(97.5)
99(100)	(100.0)	100.0	(100.0)			(100.0)	100.0	(100.0)	(76.2)	58.1	(95.2)
89	(84.0)	75.5	(96.6)			(88.4)	91.1	(99.1)	(68.4)	41.0	(92.7)
79	(74.6)	54.4	(93.8)			(79.9)	73.8	(97.4)	(58.7)	28.3	(90.1)
69	(61.3)	37.0	(91.2)			(70.4)	57.4	(95.6)	(49.0)	20.0	(87.8)
59	(51.9)	25.6	(87.9)			(60.3)	44.7	(92.9)	(42.2)	13.2	(84.3)
49 (50)	(45.3)	15.6	(84.4)	(--)	100.0	(100.0)	(50.8)	32.5	(89.6)	(36.9)	7.9	(81.4)
39	(33.7)	10.1	(80.6)	(--)	88.4	(98.3)	(41.3)	19.9	(84.2)	(29.1)	4.0	(77.8)
29	(26.0)	5.2	(76.7)	(--)	71.4	(96.2)	(30.2)	9.5	(75.3)	(24.3)	1.9	(72.7)
19	(18.8)	2.2	(69.5)	(--)	51.3	(93.4)	(21.2)	3.1	(60.6)	(20.4)	1.0	(66.1)
9	(11.0)	0.5	(55.1)	(--)	24.4	(86.7)	(12.7)	0.1	(41.2)	(13.6)	0.5	(51.7)

1. Entries are percentages of total number of pupils scoring less than corresponding raw score shown at left.
2. The middle of three columns for each test refers to 995 Local Scholarship Examination, 1948, candidates.
3. Figures in brackets to LEFT of middle column refer to hypothetical sample of 181 - 206 pupils (see para. 80).
4. Figures in brackets to RIGHT of middle column refer to the Jamaica Random Sample of West Indies Survey, 1950.

10-20 points of raw score in each test. This skewness of distribution is especially marked in the comparison with the truly random sample of the 1950 Survey, which is even more markedly skewed in the reverse direction. The source of the error in the provisional standardization of this battery is also clearly evident from a comparison of the Survey sample with the hypothetical sample, in which the selection of test items, described in paragraph 70, has been fairly successful in producing a rectangular distribution. These three distributions, for each test (two only for Vernier), are illustrated graphically in Figure 3.

FIGURE 3. HISTOGRAM OF DATA OF TABLE 14.



Chapter 10. LSE/48: Analysis of Results by Parishes

106. Extent and Effect of Migration. Before proceeding to examine the parish differences in test performance, the movement of population and its relation to the numbers of Scholarship Examination candidates, literacy and school attendance will be studied briefly. This study is based on Table 15 showing parish of birth cross-classified against parish of residence at the date of the examination. The 1943 Census revealed that the migrated population (i.e. persons

TABLE 15. BIRTH BY RESIDENCE OF LOCAL SCHOLARSHIP CANDIDATES

Parish of Birth	Parish of Residence: A	B	C	D	E	G	H	L	M	P	S	T	U	X	Total
A	167 (66)	63	3	3	3	6	2	4	1	6	-	7	3	2	270
B	24	47 (31)	1	-	2	-	-	-	-	3	-	1	6	4	88
C	3	5	11 (61)	-	1	-	-	2	-	-	1	-	1	-	24
D	6	6	1	19 (76)	2	-	-	1	-	1	1	1	6	-	44
E	6	7	-	-	42 (68)	2	-	1	3	1	-	-	1	3	66
G	6	2	1	1	4	16 (55)	1	2	-	-	2	3	-	-	38
H	2	3	-	-	1	1	26 (70)	3	-	-	-	1	1	1	39
L	7	2	-	-	-	-	2	83 (75)	1	6	2	3	-	3	109
M	4	1	-	2	-	-	-	3	4 (27)	2	-	1	1	-	18
P	3	3	-	-	1	-	1	2	-	55 (71)	-	2	1	-	68
S	3	-	-	-	-	2	2	2	1	1	13 (52)	3	-	7	34
T	7	3	1	-	2	2	2	3	1	-	6	45 (67)	-	-	72
U	11	4	-	-	2	-	1	-	3	-	-	-	54 (79)	-	75
X	4	4	-	-	2	-	-	4	1	2	-	-	3	26 (57)	46
Total	253	150	18	25	62	29	37	110	15	77	25	67	77	46	991

Explanation:

1. Entries in red are corresponding diagonal entries expressed as percentages of foot (i.e. residence) totals.
2. Parish Code (motor registration letters) begins at Kingston and proceeds alphabetically around Island in anti-clockwise direction ending with St.Catherine. Lines between columns (and rows) C & D and M & P denote east and west ends of Island respectively, thus:

M	L	H	G	E	D
Hanover	St.James	Trelawny	St.Ann	St. Mary	Portland

Westm'ld	St.Eliz.	Manch'r	Clar'don	St.Cath.	St.Andrew	St.Thos.
P	S	T	U	X	B	C

Kingston
A

not then/

not then resident in their parish of birth) comprised 21% of the whole. But 39% of the LSE/48 population had migrated, indicating that a desire for secondary schooling (as evinced by candidacy in the Local Scholarship Examination) is strongly associated with the tendency to migrate. If both indicate a desire for economic and social advancement, this association is not surprising. It may also be partly due to the greater migration of the professional, civil servant etc. classes. Further, the percentage of migrants among the LSE candidates varies among the parishes from only 24% (Portland-D) to as much as 73% (Hanover - M), though this last figure is unreliable because of the low total from this parish. In those parishes where the desire to take the examination is not pronounced (Table 6, page 64, column 3), the proportion of "natives" (i.e. non-migrants) among the candidates tends to be low; this tendency is sufficiently strong to give $\rho = \cdot 74$. Since, as has been shown in Table 6, the desire to take the examination is positively associated with standard of literacy and school attendance, one is led to infer that migrants are of relatively high mental calibre and that parishes having a high rate of emigration would consequently deteriorate both with regard to achievements and desire to achieve. This was ~~confirmed~~ supported by a set of negative correlations between rate of emigration from the several parishes (1943 Census data) and literacy, school attendance, relative entry for the LSE and the percentage of "natives" among the candidates. Table 16 shows the inter-correlations of these five variables. In

TABLE 16. INTERCORRELATIONS (ρ) ILLUSTRATING EFFECT OF MIGRATION

	LSE	1943 Census data		
	% natives	Literacy	School Attendance	Migration
LSE %	.74	.44	.38	-.40
LSE % natives		.48	.44	-.29
Literacy (1943)			.96	-.47
Attendance (1943)				-.50

1. LSE %: see para.98 and Tables 5 and 6.
2. LSE % natives: see entries in red, Table 15.
3. Literacy and Attendance: see Table 6, columns 1 and 2.
4. Migration: Census data expressing, as %age of total number of persons born in a parish, those now living elsewhere.

In calculating percentages of natives and migration rates, Kingston and St.Andrew have been regarded as one parish, as the considerable movement of population from Kingston to urban St. Andrew and vice versa can scarcely be regarded as migration.

107. Parish differences. This study of parish differences is based on 28 tables, each representing a cross-classification between 14 parishes and 14-24 score (or quotient) intervals. For each of six tests and the total quotient in the ERU battery, four tables were prepared. Two of these show the distribution of raw scores or quotients* of the candidates residing in each of the fourteen parishes, boys and girls separately. The other two do the same for parish of birth. The mean of the summed quotients in the four ERU tests (ΣQ) for the candidates resident therein was calculated for each parish and for the Island; these are shown at line 3 of Table 17. An analysis of variance (line 11), using the data of lines 1-3, showed that the variance between the parish means was highly significant, the variance ratio far exceeding 2·7, approximately the 0·1% value. Precise location of the significant differences is the aim of lines 4-10. It was first necessary (lines 4-7) to estimate the standard deviation of the difference between each parish mean and the Island mean. This is given by

$$\sqrt{\sigma^2\left(\frac{1}{n_p} - \frac{1}{N}\right)}$$

where the mean square "within parishes" may be used as the best estimate of σ^2, n_p and N being the numbers of candidates in the several parishes and the Island respectively. Subtraction of the reciprocals in the formula allows for the fact that the several parish means are not independent of the Island mean/

* In this and following paragraphs, the quotients given are those derived from the provisional standardization (see paragraph 81 and Table 3). An indication of their approximate real value is given in Table 3, page 51.

TABLE 17. ANALYSIS OF VARIANCE OF TOTAL QUOTIENTS BY PARISH OF RESIDENCE AND COMPARISON OF EACH PARISH WITH ~~REMAINDER~~ ISLAND

		Kingston	St. And'w	St. Thos.	Portland	St. Mary	St. Ann	Trelawny	St. James	Hanover	West'm'ld.	St. Eliz.	Manch'r.	Clarendon	St. Cath.	Island
1	n_p (Boys)	103	71	4	10	21	13	19	56	9	27	6	27	27	13	N = 406
2	$\Sigma(\Sigma Q)$	1403	976	60	132	319	177	263	612	128	264	68	348	319	151	5220
3	Mean $(\Sigma Q)_p$	13.621	13.747	15.000	13.200	15.191	13.615	13.842	10.929	14.222	9.778	11.333	12.889	11.815	11.615	12.857 ($\overline{\Sigma Q}_i$)
4	$1/n_p$	.00971	.01408	.25000	.10000	.04762	.07692	.05263	.01786	.11111	.03704	.16667	.03704	.03704	.07692	.00246
5	$1/n_p - 1/N$	.00725	.01162	.24754	.09754	.04516	.07446	.05017	.01539	.10865	.03457	.16420	.03457	.03457	.07446	.
6	(5)x14.6513	.1062	0.1703	3.6267	1.4290	0,6616	1.0909	0.7350	0.2255	1.5918	0.5066	2.4058	0.5066	0.5066	1.0909	
7	$\sqrt{(6)} = SD_{diff.}$	0.3259	0.4127	1.9044	1,1954	0.8134	1.0445	0.8573	0.4749	1.2617	0.7118	1.5511	0.7118	0.7118	1.0445	
8	$\overline{\Sigma Q}_p - \overline{\Sigma Q}_i$	0.7643	0.8894	2.1249	0.3429	2.3334	0.7583	0.9850	-ve 1.9285	1.3651	-ve 3.0793	-ve 1.5238	0.0318	-ve 1.0423	-ve 1.2417	
9	(8)÷(7)=t	2.3452	2.1551	1.1252	0.2868	2.8687	0.7260	1.1490	4.0609	0.1082	4.3261	0.9824	0.4470	1.4643	1.1888	
10	Signif'nce	+	+			++			---		---					

11 Analysis of Variance: $\Sigma(\Sigma Q)^2 = 66428$; $\Sigma[(2)x(3)] = 60684.703$; $4930 \times 12.143 = 59864.285$

Boys Category	Degrees freedom	Sum of squares	Mean Square	Variance ratio	Girls Category	Degrees freedom	Sum of squares	Mean Square	Variance ratio
Between parishes	13	820.418	63.109	4.31 (SSS)	Between parishes	13	1009.625	77.664	5.33 (SSS)
Within parishes	392	5743.297	14.6513		Within parishes	573	8344.180	14.5623	
Total	405	6563.715			Total	586	9353.806		

SSS = Significant at 0.1%

12	Signif'nce of (Girls)	++	+++	+	-	---	--	--		

n_p : Number of candidates in parish 'p'. N: Number of candidates in Island. ΣQ: sum of one candidate's quotients in four tests of ERU battery in units of 10-point interval from ~~500~~ 384.5 as origin. $\overline{\Sigma Q}_p$ and $\overline{\Sigma Q}_i$: mean values of ΣQ for parish 'p' and Island respectively. Full figures and calculations for girls omitted; but conclusions only. Line 12 corresponds to Line 10. Analysis of variance for girls appears at 11 on right but necessary sums of squares omitted.

Island mean. The observed differences (line 8) were then compared with their SD's giving the values of t on line 9. On line 10 (and 12) the direction of the sign(s) indicates the direction of the difference on line 8, while the number of signs indicates significance at (5% (+ and -), 1% (++ and --) or 0·1% (+++ and ---). The number of signs does not indicate the magnitude of the differences, some of the non-significant differences being as big as or bigger than highly significant ones e.g. compare St. Thomas and St. James. The whole process was repeated for girls but only the analysis of variance (at 11 on right) and the significance and direction of the differences (at 12) appear in the table. The final conclusion, as shown on lines 10 and 12, is that the means for the parishes of Kingston, St. Andrew and St. Mary are significantly higher than the Island mean while St. James and Westmoreland are significantly lower, both for boys and girls. In addition, the girls only, in Manchester and Clarendon, are significantly lower than the Island average for girls. It may be mentioned incidentally that the correlation (ρ) of the parish means and the 1943 Census literacy data is 0·37; with school attendance, $\rho = 0{\cdot}52$. It may also be noted that, with percentage of natives or non-migrants, $\rho = -0{\cdot}25$ but this value is too low to justify any firm inference in support of the suggestion in paragraph 107 concerning the mental calibre of migrants. Correlation with the permille of 1947 attendance taking the examination and with percentage migration yields negligible negative values of ρ.

108. This dual process of (a) analysis of variance followed by (b) precise location of the significance, was repeated, for boys and girls separately, for each of the four ERU tests individually and also for Essay and General General Knowledge. The results of these analyses are summarized in Tables 18 and 19. Table 18 shows the mean squares "between parishes" (as calculated at (11) on Table 17 and its/

and its 27 counterparts) together with the corresponding variance ratios. The findings of part (b) of each of the 28 calculations are given in Table 19 page 89. This table comprises lines 3 and 10 of Table 17 but puts the parishes in rank order of means (by residence), adding the rank order in each case.

109. It is seen from Table 18 that the differences between parishes, both of birth and of residence, are significant in every instance, for all tests and both sexes.

TABLE 18. MEAN SQUARES BETWEEN PARISHES AND VARIANCE RATIOS

		Intelligence	Vernier	Arithmetic	English	Total Quotient	Essay	Gen'l Know.
BOYS								
Residence	MS	19.4	25.8	13.4	12.9	63.1	37.2	36.4
	VR	3.6	4.8	3.3	3.0	4.3	3.2	4.5
Birth	MS	17.2	20.1	9.4	13.3	58.5	24.3	25.5
	VR	3.2	3.6	2.3	3.1	3.9	2.0	3.0
GIRLS								
Residence	MS	22.0	33.9	13.6	20.1	77.7	19.2	24.1
	VR	4.2	6.1	3.4	5.4	5.3	1.9	3.5
Birth	MS	22.1	25.4	8.8	18.9	64.2	27.8	22.4
	VR	4.3	4.4	2.2	5.1	4.3	2.8	3.2

From Fisher's Tables:	Approximate probability	.05	.01	.001
	Variance ratio	1.7	2.1	2.7

All entries, which have been calculated in units of group interval, are correct to one decimal place.

All but four variance ratios are significant at 0.1% and only two attain less than 1% significance. These two both relate to the parish means in the Essay but both are significant at 5%. The other two exceptions both relate to Arithmetic (by birth) for both boys and girls. In this regard, it is worthy of note that the differences in Arithmetic (as indicated by mean squares) are much less pronounced than in other tests. The inference is that the quality of the teaching of Arithmetic (to Scholarship candidates) and/or the ability of children to learn the subject varies comparatively little from parish to parish. However, the data available are not sufficient to warrant describing this inference as a conclusion but they do suggest that further investigation of this might well be made. Confirmatory evidence may be forthcoming/

forthcoming from the analysis of the test results in the Surveys (paragraphs 57 and 61).

110. A general observation, based on Tables 18 and 19, is that, in all tests, the average performance of the children of some parishes is significantly better than that of the children of other parishes. This is true whether the candidates are classified according to parish of residence or parish of birth, but it is seen from Table 18 that the mean squares between parishes of birth are less, often much less, than between parishes of residence, with three exceptions only. In only one of these exceptions (girls' Essay) is there a marked difference in the other direction; in the other two exceptions (girls' Intelligence and boys' English) the mean squares are virtually the same both for birth and for residence. In attempting to draw any conclusion from this fact, it is at once evident that the effects due to parish of birth are not independent of those due to parish of residence and there is no sound reason to suppose that the differences between the parishes can be ascribed peculiarly to birth. On the other hand, there is not sufficient evidence to declare that such innate differences do not exist. The greater mean squares, as between parishes of residence, suggest that the differences are due chiefly (not necessarily solely) to the children's having been reared in different parishes. There are several aspects of this including, for example, different home environments which may reflect differing economic circumstances; but one important factor (though only one) is the quality of the schooling they have received. Nothing more conclusive than this cautious statement is justified on the strength of the data here available. To warrant a more definite conclusion, one would need to design a specific experiment on a much more random sample than the present highly selected group and then, in the analysis, to fix constants for both birth and residence and for/

and for each of the parishes. Here again, such confirmatory evidence may be forthcoming from the results of the Surveys. The following observations, on the performance of the candidates from the several parishes, are made on the basis of Table 19.

111. A* - Kingston offered relatively more candidates, as measured as a permille of the 1947 average attendance, than any other parish. The percentage of these who were already attending grant-aided secondary schools was just more than the percentage for the Island in the case of the boys and just below it in the case of the girls. Both its boys and its girls, whether by birth or by residence, ranked 5th or higher in the Island in three of the four ERU tests and in summed quotients and were significantly superior to the Island means in these cases. In Arithmetic, however, both boys' and girls' means were no higher than 7th or 8th in the Island, were only 1 point of quotient, more or less, above the Island mean and did not differ significantly from it. The same was true of their performance in the General Knowledge test, in which its boys were lowest among those parishes above the Island mean. The poorest performance was in the Essay paper where both boys and girls were below the Island mean, the boys being significantly so and being removed only two places from the bottom.

112. B - St. Andrew offered the second largest relative number of candidates but the percentage of these who were drawn from grant-aided secondary schools was much higher than in Kingston and second only to Manchester in the whole Island. Unlike Kingston, where, in general, there was not a great difference between sexes, the girls of St. Andrew were consistently better than the boys. This parish's girls, whether by virtue of birth or residence, were consistently best/

* The letters used here are the parish letters as used in Table 19 and as explained in Table ~~16~~ 15, page 73.

best in the Island in all/tests and summed quotients, being highly* significantly above the means, with the single exception of Arithmetic. In this subject, however, the parish's girls, by birth, still occupied leading place while the girls living in the parish occupied 4th place. In Essay and General Knowledge, the girls born there were still top and second, exceeding the Island mean by a very significant margin, but the girls living there earned for the parish only 4th and 7th places respectively and, in the case of General Knowledge, were only slightly above the mean performance for the Island. The boys did not represent their parish of birth or residence so well as the girls. In only two ERU tests and in the summed quotients were they significantly above the Island mean and this in the case of residents only who rose to 2nd and 4th places in English and Vernier respectively. In Arithmetic, their performance was virtually no better than the average for the Island but it was in Essay and General Knowledge where they fared worst, being below the Island mean in all cases in the 10th place or lower. In the Essay the boys born in St. Andrew were next to bottom in the Island and were significantly below the Island mean.

113. C - St. Thomas, although an "Unprovided Area", supplied relatively few girls and fewer boys as candidates and, in this respect, was 11th among the 14 parishes (13th in respect of the number of boys). There was a slightly greater number of candidates who were born in St. Thomas but, even so, this represented only a little more than half of its expected frequency (see Table 5, page 63). Only one of the candidates was already a pupil at a grant-aided secondary school. In quality, the candidates from this parish more than amply compensated for their deficiency in numbers, the handful of boys being consistently better than the girls except/

* Here and subsequently, a convention is adopted of using "highly" (or "high"), "very" and neither to imply significance at 0.1%, 1% and 5% respectively, so avoiding repetition of the cumbersome phrase: "significant at the 0.1% level" etc.

except in the Essay. Both boys and girls (resident) led the Island in Arithmetic and, in spite of their small numbers, which contributed to a high SD of the difference, the boys exceeded the Island mean in this test by a significant margin. In the four ERU tests, the boys of this parish, whether native or resident, earned not lower than 5th place but chiefly top, sharing these honours with the boys of St. Mary. Their performance in the Essay and General Knowledge, however, was little better than average. With the exception of their prowess in Arithmetic and 3rd place in Essay, the girls living in St. Thomas were placed 5th to 9th, being above average in all but English. In general the girls born in St. Thomas were slightly poorer than the girls living there.

114. D - Portland also offered few candidates, boys and girls, and was only slightly better than St. Thomas in respect of relative numbers. Only one of the candidates was a secondary school pupil. The strong point of both boys and girls was General Knowledge, in which the girls were significantly above the mean and occupied top place, while the boys were third. The girls only excelled, too, in the Essay in which they were placed 2nd. Otherwise, their performance was average, more or less, with a slight superiority of the boys over the girls except in the Essay and in English. Except in their one forte of General Knowledge and in the Essay, candidates living in Portland were not so good as candidates born there.

115. E - St. Mary, another "Unprovided Area", offered rather fewer candidates, proportionately, than the average for the Island, though the deficiency was not significant. The percentage of these already attending secondary schools was greater than in St. Thomas and Portland but less than the percentage for the whole Island. The candidates living in the parish, boys and girls considered together, achieved the best all-round success in the examination. This may also be said of/

said of the St. Mary-born boys but not of the girls born there. Unlike parishes referred to above, success in the ERU tests, not excepting Arithmetic, was matched by equal success in the Essay and General Knowledge. The parish owes this precedence chiefly to the efforts of its boys who were consistently better than the girls, even in English and the Essay, though to a more slight extent in these tests and in Arithmetic. In all tests and in summed quotients, the boys were significantly above the Island mean; this cannot be said of either boys or girls of any other parish. Candidates living in the parish were consistently better than those born there although the boys born in St. Mary excelled those born elsewhere. Without exception, the boys living in this parish were the best single group of candidates, being second to the girls living in St. Andrew only in English.

116. G - St. Ann supplied only one third of the mean permille number of candidates for the Island although there were about 30% more candidates born in the parish than living there. St. Ann was second only to St. Elizabeth in the relative fewness of pupils living there who offered as candidates. There were also relatively few of its candidates who were already attending secondary schools, the percentage being less than half the percentage for the Island. However, it offered relatively more private secondary school pupils than any other parish. Both boys and girls maintained a higher-than-average standard in all tests, though the girls fell below the mean, while the boys reached the top, in the Essay. This latter was the only instance in which St. Ann pupils were significantly above the mean. Otherwise, there was no great difference between boys and girls or between resident and native pupils.

117. H - Trelawny offered as many candidates, proportionately, as St. Mary or just fewer than the Island average; like St. Mary it is an "Unprovided Area". Two pupils were already attending grant-aided secondary schools i.e. only one-

one-third of the percentage for the Island. In general, the candidates living in Trelawny were fairly matched with those living in St. Ann, any slight superiority of the boys of one parish in any one respect being balanced by a corresponding slight superiority of the girls in another direction and vice versa. Thus, the top place occupied by the St. Ann boys in the Essay was matched by the Trelawny girls in the same position in the same subject. The other general remarks made of St. Ann may be applied equally well to Trelawny.

118. L - St. James offered relatively more boys than any other parish and, in number of girls, was exceeded only by Kingston and St. Andrew. Boys and girls together were more than twice the Island permille and more than twice the next largest number, which came from Westmoreland. Indeed, Kingston, St. Andrew and St. James, the three parishes with any great degree of urbanization, were the only parishes which offered relatively more candidates than the average for the Island and the excess was considerable. Then, too, the percentage of secondary school pupils offering as candidates was higher than for the Island and for Kingston but lower than St. Andrew. As in St. Andrew, the girls, whether born or living there, were consistently better than the boys. Beyond these few points, however, the similarity ends for, whereas the general level of performance in Kingston and St. Andrew was consistently high or fairly high, the general level of performance in St. James was consistently low and significantly so. Except in the Essay, in which the boys reached the average score while the girls exceeded it, the general rank of the parish was 11th to 13th. Except for a slight tendency in this direction in the case of the boys, there was no noticeable superiority of candidates born in the parish over those resident there.

119. M - Hanover came next to St. Ann and St. Elizabeth in the/

in the relative fewness of its candidates. In actual numbers, there were fewer candidates born or living in Hanover than in any parish and the further fact, that only a quarter of the candidates were both native and resident (see paragraph 107 and Table 15), led to the most exceptional observed difference between native-born and resident candidates. Whereas the boys born in Hanover were, in all respects, significantly below the Island means and consistently bottom by a wide margin, the boys living in the parish were consistently near the top, being 2nd or 3rd in three out of six tests, although their superiority was not quite significant in any instance. It is fairly certain that little importance can be attached to this phenomenon for it was not repeated in the girls' performance where the differences between the natives and the residents were neither so great nor were they always in the same direction. Thus, while the girls born in Hanover were top in the Island in General Knowledge and were far superior to the girls living in the parish, this superiority was reversed in the summed quotients of the ERU tests, where the girls living in the parish attained 3rd place in the Island.

120. P - Westmoreland, as mentioned in paragraph 118, offered relatively more candidates than any country parish other than St. James, while, unlike St. James, the percentage of these who were already attending secondary schools was lowest in the Island. As in St. James, there was no marked superiority of those born in the parish over those living there except for a slight tendency in this direction in the case of the boys. Also like St. James, the general level of performance was low and significantly so. With only two exceptions, this parish was bottom or next to it in all tests, both in respect of native-born pupils and residents.

121. S - St. Elizabeth, one of the most populous parishes, supplied relatively fewest candidates and only one of these/

of these was a secondary school pupil. In general, these pupils made an even performance in all tests at a level rather below the mean performance for the Island, except in the Essay in which both boys and girls rose above the mean, the boys going to 4th place. On the whole the girls were superior to the boys whose average rank was about 11th. While there was a tendency for boys born in the parish to be superior to those living there, this was not true of the girls, such slight difference as there was being in the other direction.

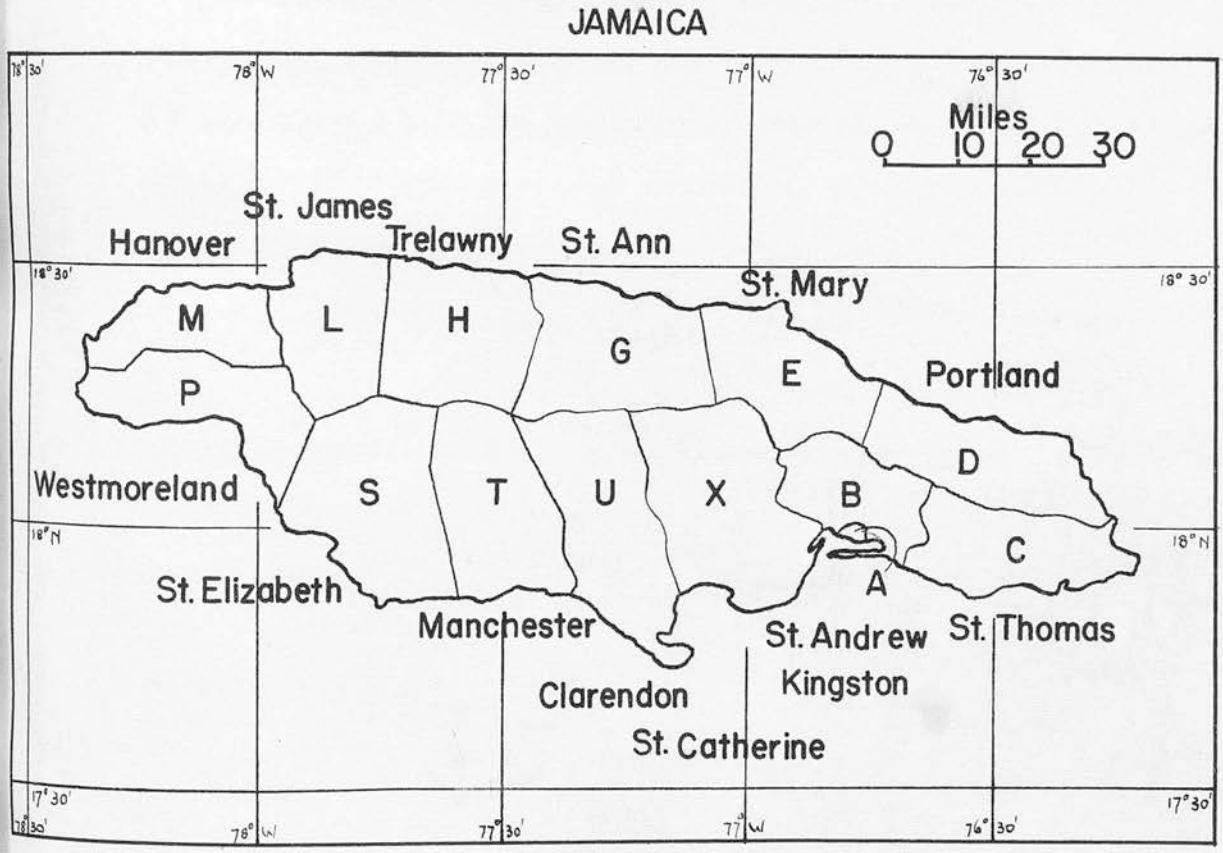
122. T - Manchester ranked 7th among the parishes in the relative number of candidates but had a higher percentage of secondary school pupils than any. Among the boys, the number of secondary school pupils exceeded those from elementary schools, this being the only such instance. One-third of all candidates were already attending secondary schools. These candidates made an even performance about or below the mean for the Island. On balance, the boys were better than the girls except in English and the Essay. The boys' general rank was 9th while the girls, who were significantly below the Island means in three of the four ERU tests and in summed quotients, varied between 12th and 13th place. Most of the differences between native-born and resident candidates were in favour of the former, though none were large.

123. U - Clarendon, the fourth "Unprovided Area", was very similar to Manchester, its neighbour, in all respects except that a very low percentage of candidates were secondary school pupils. By and large, the boys living in Clarendon were not so good as those of Manchester, except in Arithmetic, but the general performance in both parishes in other respects was roughly equal.

124. X - St. Catherine, another of the most populous parishes in the Island, offered relatively only half as many candidates/

candidates as the average for the Island and little more than half as many as Clarendon. However, a much larger percentage were secondary school pupils, this parish being exceeded only by Manchester and St. Andrew in this respect. The performance of its pupils was consistently low in all tests, the boys being generally poorer than those of Manchester and Clarendon, while the girls were rather better than the girls of the same two parishes except in the Essay, in which the St. Catherine girls, native-born and resident, were significantly below the Island mean and occupied the lowest place or next to it. Girls living in the parish were slightly superior to those born there but there was no such noticeable difference among the boys.

FIGURE 4. MAP OF JAMAICA SHOWING PARISHES AND PARISH LETTERS



125. Summarizing the preceding fourteen paragraphs from a geographical standpoint, there was a marked tendency for the candidates from the parishes at the east end of the Island to be/

to be superior to those at the west end while, in the middle of the Island, the northern parishes were superior to the southern. Roughly the same geographical distribution of literacy and school attendance may be observed in the data from the 1943 Census given in Table 6, page 64. Beyond remarking this broad generalization, however, and noting it for possible confirmation by the Survey results or by future experiment, no further comment or possible explanation will be ventured, except for brief reference to St. James. The fairly high place occupied by this parish in literacy and school attendance is not in accord with its very low rank in the Scholarship Examination. This may be due to the fact that the number of candidates taking the examination was quite large and, in consequence, not very highly selected. If so, one might expect Kingston and St. Andrew also to be low in the Island; they are not. Moreover, the rank order correlations between the permilles of 1947 attendance offering as candidates and the placings of the parishes of residence in the several tests, while predominantly negative, are very small or virtually zero. They are:

	Intell-igence	Vernier	Arith-metic	English	Total Qs	Essay	Gen. Know.
Boys	-.14	.05	-.33	.07	-.11	-.39	-.19
Girls	-.01	-.02	-.15	.04	-.09	.03	-.11

TABLE . JAMAICA LOCAL SCHOLARSHIP EXAMINATION, 1948. TEST MEANS AND RANK ORDER OF PARISHES (OF BIRTH AND OF RESIDENCE), BOYS AND GIRLS SEPARATELY

BOYS

INTELLIGENCE (T1)		VERNIER (S1)		ARITHMETIC (A1)		ENGLISH (E1)		TOTAL QUOTIENT (ΣQ)		ESSAY		GENERAL KNOWLEDGE	
Birth	Resid.	Birth	Resid.	Birth	Resid.	Birth	Resid.	Birth	Resid.	Birth	Resid.	Birth	Resid.
C 114.1/1	118.3/1	E 114.3/2	117.5/1	C 109.1/4	117.0/1	E 109.5/3½	112.7/1	E 448.0/2	456.4/1	G 18.6/2	19.9/1	E 37.5/1	42.5/1
E 112.3/3	114.4/2	M 98.3/14	114.8/2	H 108.1/6	111.5/2	B 108.2/9	110.7/2	C 450.2/1	454.5/2	E 18.9/1	19.5/2	M 18.9/14	38.1/2
M 99.5/14	113.7/3	A 113.6/3	113.3/3	G 109.3/3	111.2/3	C 109.9/2	109.5/3	M 389.5/14	446.7/3	H 17.1/4	18.2/3	D 32.0/6	38.0/3
B 110.0/8	111.6/4	B 111.6/6	112.9/4	E 109.8/1	110.8/4	A 110.7/1	109.1/4	H 435.2/8	442.9/4	S 14.2/10	17.5/4	H 34.1/3½	35.7/4
A 112.4/2	111.3/5	C 116.3/1	112.0/5	M 97.6/14	110.3/5	H 108.4/7	108.3/5	B 437.4/6	442.0/5	U 17.2/3	17.4/5½	G 36.3/2	33.5/5
H 107.4/9	110.7/6	H 110.2/8	111.7/6	U 108.9/5	108.5/6	G 108.7/5	108.2/6	A 443.6/3	440.7/6	M 10.3/14	17.4/5½	T 31.5/8	32.2/6
G 110.7/7	110.5/7	G 112.3/4	111.6/7	D 109.5/2	108.0/7	M 96.4/14	108.1/7	G 441.8/5	440.7/7	T 16.5/6½	17.0/7	U 33.0/5	31.4/7
D 112.0/4	110.0/8	D 112.3/5	111.0/8	A 107.9/7	107.3/8	D 109.5/3½	108.0/8	D 443.4/4	436.5/8	D 16.7/5	16.7/8	C 34.1/3½	31.0/8
T 110.8/6	110.0/9	T 110.8/7	110.3/9	B 107.3/8	106.9/9	T 108.6/6	107.7/9	T 436.6/7	433.4/9	C 16.5/6½	15.7/9	A 31.9/7	30.7/9
Mean	109.2	Mean	110.1	Mean	106.6	Mean	107.6	Mean	433.1	Mean	15.4	Mean	29.6
U 111.2/5	108.3/10	X 105.4/12	106.2/10	T 107.0/9	106.4/10	U 108.4/8	107.2/10	U 433.4/9	422.6/10	L 15.7/8	15.1/10	B 27.7/9	28.6/10
S 107.0/10	107.8/11	L 105.9/11	104.7/11	S 106.2/10	103.7/11	X 104.8/11	105.1/11	X 417.6/11	420.7/11	B 13.0/13	14.7/11	X 27.0/10	24.7/11
X 104.5/12	107.0/12	S 107.4/10	103.7/12	X 104.5/11	103.2/12	L 103.8/12	103.1/12	S 427.6/10	417.8/12	A 15.0/9	14.2/12	L 22.8/13	22.3/12
L 104.7/11	103.0/13	U 108.5/9	102.4/13½	L 102.9/12	102.5/13	S 105.9/10	102.8/13	L 417.6/12	413.8/13	X 13.6/11	13.3/13	S 24.7/11	22.0/13
P 101.5/13	100.5/14	P 102.5/13	102.4/13½	P 101.7/13	99.4/14	P 101.7/13	100.5/14	P 406.9/13	402.3/14	P 13.2/12	10.5/14	P 24.3/12	21.3/14

GIRLS

INTELLIGENCE (T1)		VERNIER (S1)		ARITHMETIC (A1)		ENGLISH (E1)		TOTAL QUOTIENT (ΣQ)		ESSAY		GENERAL KNOWLEDGE	
Birth	Resid.	Birth	Resid.	Birth	Resid.	Birth	Resid.	Birth	Resid.	Birth	Resid.	Birth	Resid.
B 117.2/1	114.7/1	B 116.4/1	115.2/1	C 107.0/7	111.2/1	B 116.7/1	115.9/1	B 459.7/1	453.3/1	H 19.9/3	20.6/1	D 33.9/3	37.0/1
E 108.7/8	112.8/2	E 110.3/7	113.4/2	E 107.5/5	110.2/2	H 111.8/4	112.3/2	E 435.2/7	448.6/2	D 20.0/2	19.7/2	H 31.4/4	34.8/2
A 112.3/2	111.8/3	G 112.4/3	112.9/3	G 108.3/2	109.5/3	E 108.5/8	112.1/3	M 441.5/5	444.5/3	C 19.1/5	19.4/3	E 29.6/6	33.9/3
M 109.5/7	112.0/4	A 112.1/4	112.2/4	B 110.1/1	108.1/4	A 112.7/2	112.1/4	G 444.1/2	443.3/4	B 20.3/1	18.9/4	G 31.1/5	30.4/4
C 109.9/6	110.5/5	M 113.0/2	112.0/5½	D 108.0/4	107.3/5	Mean	110.2	A 442.8/4	443.0/5	E 16.7/10	18.8/5	A 29.4/7	30.4/5
G 110.9/4	110.4/6	C 109.9/8	112.0/5½	H 108.2/3	107.3/6	G 112.7/3	110.1/5	C 435.1/8	442.2/6	L 17.8/7	18.2/6	C 28.2/8	29.3/6
S 108.0/9	110.4/7	H 111.8/5	110.3/7	A 106.5/8	107.1/7	C 108.5/9	108.9/6	H 443.3/3	441.2/7	U 16.9/9	18.0/7	B 34.1/2	29.3/7
H 111.6/3	110.3/8	Mean	109.6	X 104.8/11	106.4/8	S 108.4/10	108.8/7	Mean	435.6	S 15.8/12	17.7/8	Mean	28.7
Mean	109.8	S 106.8/10½	109.4/8	M 107.5/6	106.2/9	M 110.0/6	108.7/8	D 440.7/6	431.8/8	Mean	17.6	X 25.8/12	28.5/8
D 110.5/5	108.7/9	X 107.5/9	108.7/9	Mean	106.1	X 107.0/12	108.5/9	S 427.4/10	431.3/9	G 19.3/4	17.5/9	U 27.6/9	28.3/9
X 106.2/13	108.1/10	D 110.7/6	107.7/10	U 104.4/12	104.5/10	D 111.2/5	108.0/10	X 425.8/11	430.9/10	A 17.7/8	17.0/10	S 27.2/11	26.7/10
L 106.6/12	107.1/11	L 105.9/12	106.3/11	S 105.1/9	104.4/11	U 108.9/7	107.6/11	L 424.5/13	425.6/11	T 16.5/11	16.6/11	M 36.0/1	25.3/11
U 107.9/10	106.7/12	T 106.8/10½	104.4/12	L 104.3/13	103.8/12	L 106.5/13	107.4/12	T 427.6/9	420.1/12	M 18.1/6	16.2/12	T 27.5/10	25.3/12
T 107.4/11	105.1/13	P 103.1/14	103.2/13	T 105.0/10	103.3/13	T 108.3/11	107.2/13	U 425.3/12	420.1/13	X 14.6/14	15.6/13	L 23.9/13	24.5/13
P 101.7/14	102.9/14	U 104.0/13	102.1/14	P 100.5/14	99.9/14	P 104.2/14	104.1/14	P 410.5/14	410.8/14	P 15.1/13	15.3/14	P 20.6/14	21.0/14

Parish letters:

A	B	C	D	E	G	H	L	M	P	S	T	U	X
Kingston	St.Andrew	St.Thomas	Portland	St.Mary	St.Ann	Trelawny	St.James	Hanover	Westmoreland	St.Elizabeth	Manchester	Clarendon	St.Catherine

Each list is given in rank order according to Parish of Residence; not Birth. Thus, parishes whose means, by birth, are above the Island Mean may appear in the list below the Island Mean and vice versa. The mean, correct to one decimal place, precedes the /; the rank order follows the /. "½" in rank order indicates a tie.

Parish Means, whose deviation from the Island Mean, above or below, is significant at the 0.5% level at least, are underlined with a continuous line, thus: 112.9/4. The interrupted line: _____: merely denotes the position of the Island Mean.

Entries in the first four columns are mean quotients in the four ERU Tests. Entries in the fifth column are mean summed quotients in the four ERU Tests. Entries in the last two columns are mean raw scores. Each of the 28 lists summarizes the results of an analysis of variance of the corresponding mean quotients or raw scores by parish of residence or birth followed by a comparison of the several parish means with the Island mean, as set forth in Table : "Analysis of Variance of Total "Quotients by Parish of Residence and comparison of each Parish with Island."

CHAPTER 11. LSE/48: SEX AND SCHOOL DIFFERENCES.

126. Sex Differences. Table 20 shows the means and standard deviations of boys' and girls' quotients in all four tests of the ERU battery, their total quotients in these four tests and their scores in General Knowledge and English Essay.

TABLE 20. MEANS AND STANDARD DEVIATIONS IN TESTS BY SEXES

	Test	Intelligence (IQ)	Vernier (VQ)	Arithmetic (AQ)	English (EQ)	Total Quotient (ΣQ)	Gen. Know.	Essay
Boys (406)	Mean	109.20	110.08	106.56	107.60	433.07	29.65	15.35
	S.D.	12.01	12.22	10.28	10.56	40.15	14.92	7.05
Girls (587)	Mean	109.77	109.56	106.12	110.24	435.61	28.67	17.62
	S.D.	11.72	12.38	10.15	9.99	39.85	13.38	6.40
Significance of Difference		NS	NS	NS	SSS	NS	NS	SSS

1. All entries approximated to two decimal places.
2. Entries in first five columns are quotients.
3. Entries in last two columns are raw scores.
4. NS = Not significant at 5%; SSS = Highly significant. (at 0.1%)

The slight excess of the boys' over the girls' mean AQ is not at all significant nor is the rather greater difference between the means in General Knowledge. On the other hand, the girls' superiority both in English and in Essay is highly significant, P being less than 0.0001 for English and less than 0.000,01 for Essay. The girls' mean ΣQ is greater than the boys' but the difference does not attain significance. This greater "verbal facility" of girls as compared with boys, to which is commonly ascribed girls' superiority in English and related tasks, has not given to the girls any superiority in the Intelligence tests. Combining the mean IQs from the ordinary and Vernier tests, the difference between sexes lies only in the second decimal place. However, it is doubtful whether much importance can be attached to these differences by themselves, the degree of selection of boys and girls being unknown. The greater number of girls, especially from elementary schools, would suggest dilution of the whole sample of girl candidates. It is worthy of comment that, in spite of this, the girls as a whole group have maintained their superiority in both English papers.

127. Because of this/

127. Because of this preponderance of girls from elementary schools, a finer analysis of sex differences was made on data classified by schools; and, for the further reason that the elementary school candidates were a heterogenous lot drawn from four different standards (chiefly Standard 6 but also from Standards 4 and 5 and even Standard 3), this classification was extended by breaking down the elementary school candidates into standards. 70.7% were pupils in Standard 6, 24.6% in Standard 5 and 4.6% were in either Standard 3 or 4, the proportions being roughly the same for both sexes. Finally, on account of their small numbers, and the vagueness of the distinction between "secondary" and "elementary", all candidates from private schools, whether secondary or elementary, together with the handful receiving private tuition (see analysis in Table 8, page 66), were collectively classed as "Private".

128. Fourteen analyses of variance, of the kind shown in Table 21, were performed with these classified results for the six tests individually and the summed quotients in the ERU tests, for sexes separately. Table 20 deals with the boys' Intelligence Quotients and the variance ratio of 10.52 shown at (5) far exceeds the corresponding 0.1% point (4.62) thus pointing to highly significant differences between the five classes. Precise location of this significance is the purpose of the calculations at lines 6 to 12. This reveals that the combined mean for standards 3 and 4 and the mean for Standard 5 are very significantly below the general mean for the Island while the grant-aided Secondary School mean is very significantly above it. The Standard 6 and private school means are also above the Island mean but the excess does not attain 5% significance. The variance ratios arrived at in all 14 analyses of variance were of the same order of significance. Most of the variance ratios were well above 10, the highest being 19 and the lowest 7. This was clearly due in greatest measure to the deficiency of the Standard 3/4 and 5 means.

129. This deficiency is not very surprising, as one would naturally expect that pupils, who had failed to reach Standard 6, would not have as high/

TABLE 21. ANALYSIS OF VARIANCE OF LSE/48 RESULTS BY STANDARDS AND BY SCHOOLS

	Boys	Elementary Standards 3/4	Elementary Standards 5	Elementary Standards 6	Grant-aided 2ndary	Private (all kinds)	Intelligence Total
1	Number of Candidates	7	59	176	93	54	389
2	Total IQs	63	591	2063	1121	644	4482
3	Mean IQ ($\overline{IQ_s}$)	9.00	10.02	11.72	12.05	11.93	11.5219($\overline{IQ_i}$)
4	Sums of squares etc.	$\Sigma(IQ)^2 = 53872$;	(2)x(3) = 51861.24;			4482 x 11.5219 = 51640.94	

5	Analysis of Variance	Sums of squares	d.f.	Mean square	F	
	Between classes	220.3019	4	55.08	10.52	SSS
	Within classes	2010.7619	384	5.24		
	Total	2231.0638	388			

6	1/n	.1429	.0169	.0057	.0108	.0185	.0026(1/N)
7	(1/n - 1/N)	.1403	.0144	.0031	.0082	.0159	
8	5.24(1/n-1/N)	.7346	.0753	.0163	.0428	.0835	
9	$\sqrt{(8)}$ i.e. SD of difference	.8571	.2744	.1276	.2070	.2890	
10	($\overline{IQ_s}$ - $\overline{IQ_i}$)	-2.52	-1.51	0.20	0.53	0.40	
11	10 ÷ 9 = t	2.94	5.49	1.57	2.57	1.40	
12	Significance	SS	SSS	NS	SS	NS	

t-test

13	$\Sigma(IQ)^2$	25061	13943
14	SD^2_{IQ} (Variance of IQs)	4.94	4.60
15	~~$SE^2_{\overline{IQ}_s}$ (Variance of mean IQs)~~ SD of difference between means	$\sqrt{.0775}$ = .2784	
16	Difference	.3322	
17	16 ÷ 15 = t	1.19 NS	

Explanation

NS = Not significant at 5%; SS, SSS = Significant at 1%, 0.1% resp.

IQs measured in units of group interval (5-point) 50-54 as zero.

Most entries approximated to 2 or 4 decimal places.

Total number of candidates (389) omits 17 candidates whose school or standard was not stated

($\overline{IQ_s}$) = mean IQ of standard or school type. ($\overline{IQ_i}$) = mean Island IQ

Difference between Grant-aided Secondary and Private School mean IQs (0.12) was obviously not significant and was not tested at lines 13-17.

A further analysis of variance, omitting standards 3, 4 and 5, gave a non-significant variance ratio; the analysis is omitted.

as high IQs as pupils, of similar age*, who had; nor would one expect them to have attained as high standard in Arithmetic, English, Easay and General Knowledge. Consequently, their presence in the analyses of variance obscured such less noticeable differences as might exist between the remaining classes, where one would more reasonably expect equality of performance. Thus, to find that the S*1 mean was very significantly above the general mean for the Island was not especially enlightening as the Island mean was considerably depressed by the performance of Standards 3-5. Moreover, the analysis as performed in Table 21 failed to show whether there were any significant differences between the 6, S and P means. Therefore, a further analysis of variance, omitting Standards 3, 4 and 5, was performed and this, in contrast to the variance ratio of 10.52, gave a variance ratio of only 2.12 which is not even as great as that corresponding to 10% significance. However, since there seemed to be a priori reasons for testing the differences between the 6, S and P means individually, the t-test was applied to the difference between the 6 and S means and found to be not significant. The (S - P) and (P - 6) differences between means were seen to be not significant purely by inspection and were not tested.

130. This pattern of analysis was repeated, with one amendment, with all 14 sets of means and the findings are summarized in Table 22 page 94. The amendment referred to consisted of the use of the mean square within classes (at (5) in Table 21) as the best estimate of the variance of IQs, whereas on line 14 of Table 21 the variance was calculated for each class separately - an unnecessary step unless there be any reason to doubt the validity of the underlying assumption of homogeneity of variance from class to class. There was reason for such doubt in the case of the Essay class variances, where the variances for Standard 6 (both boys and girls) were noticeably less than for S and P. These differences were tested: in the case of the girls, neither (S-6) nor (P-6) attained significance but, in the case/

* The difference between the mean ages of the Standard 3/4 and the Standard 6 candidates was only 2.30 months.

*1 For convenience, the Standard 6 (Elementary School), the Grant-aided Secondary School and the Private School means will be referred to respectively as the 6, S and P means.

TABLE 22. STANDARD AND SCHOOL MEANS AND SIGNIFICANT DIFFERENCES

Test	Sex	3/4	5	6	S	P	Island	Sig'nt Diffs.
Intelligence	B	97.00	102.08	110.61	112.27	111.63	109.61	None
	G	102.40	103.31	111.13	114.03	112.82	109.78	None X
Vernier	B	99.27	102.57	110.97	113.67	113.20	110.28	None X
	G	103.00	102.54	110.83	114.03	112.73	109.49	S-6
Arithmetic	B	97.91	100.12	109.33	106.14	108.94	106.77	6-S
	G	98.60	101.50	108.57	104.68	107.25	106.18	6-S
English	B	96.55	100.93	108.98	110.39	109.78	107.83	None
	G	103.80	104.43	111.55	114.17	112.41	110.25	S-6
Summed quotient	B	389.05	404.99	439.44	442.46	443.20	433.91	None
	G	408.50	411.80	441.87	446.67	445.81	435.64	None
Essay	B	11.77	11.88	17.33	15.62	14.02	15.47	6-P †
	G	13.12	14.93	18.72	18.56	17.29	17.57	None
General Know'ge.	B	17.00	21.92	34.91	27.97	28.76	29.92	6-S 6-P
	G	18.92	22.50	32.50	25.26	28.31	28.67	6-S 6-P

Explanation

3/4, 5 and 6 are those Standards in Elementary Schools
S = Grant-aided Secondary Schools. P = Private Schools.

Significant differences are given with higher mean first; they are significant at 5% or more. If significant at 1% they are underlined; if significant at 0.1% they are doubly underlined.

For first four tests and summed quotients, entries are quotients. For last two tests, entries are raw scores.

All entries are given correct to two decimal places only.

In Sex column, B = Boys, G = Girls.

The numbers of candidates on which these means are based are:

	3/4	5	6	S	P	Island
Boys	7	59	176	93	54	389
Girls	25	111	312	69	61	578

X S-6 just failed to attain significance at 5% level.

† 6-S just failed to attain significance at 5% level.

the case of the boys, (P-6) approached 5% significance while (S-6) was significant at 1%. For this reason, the variances of boys' scores in the Essay were calculated directly from the observed distributions while, for girls, the within classes mean square was taken as the best estimate. The remarks which follow are based on the summary presented in Table 22.

131. The highly significant and consistent inferiority of the Standards 3/4 and 5 means illustrates that elementary school pupils, who have not reached Standard 6, are, in general, not so well fitted for secondary education as those who have. This generalization does not exclude exceptional cases of individual pupils who, while not having yet reached Standard 6 for one reason or another, could nevertheless be suitably transferred to secondary schools direct from a lower standard. For instance, there were seven girls, whose IQ exceeded 120, and therefore exceeded the IQ of 79% of the Standard 6 girls and of 74% of the girls already attending secondary schools, but who were still in Standard 5. On the strength of their potential ability, it would seem eminently advisable that such girls should have proceeded immediately to secondary schools, without first spending a year in Standard 6. On the other hand, while the first need of the secondary schools is for pupils of high potential ability, it is also important that those pupils should have realized a minimum standard of attainment in elementary education: it cannot be regarded as the proper function of a secondary school to provide elementary education to any of its pupils, however potentially brilliant they may be. Thus, only two of these seven girls had AQs over 120 and only two (not the same two) had EQs over 120. Only three averaged more than 120 in all four ERU tests and none averaged more than 125, as did 7% of the Standard 6 girls and 12% of the secondary school girls. Another factor that cannot be overlooked is age: all but two of the seven would have been less than 11:8 on admission while one would have been only 9:7. There were no boys from Standard 5 whose IQ exceeded 120 and there were neither any boys nor any girls of such IQ in Standards 3 or 4.

132. Table 22 shows that the secondary school candidates, both boys and girls, had higher mean IQs, as measured by both intelligence tests, than either private school or Standard 6 candidates; the latter had the lowest/

lowest mean IQs. However, only one difference (S-6 (girls) Vernier) attained 5% significance, though two other (S-6) differences approached it. One would naturally expect that a group of pupils, already selected to receive secondary schooling, should have a higher mean IQ than groups being presented for selection. On the other hand, some satisfaction may be derived from the fact that the tests seemed to confer no great advantage to the secondary school pupils (the greatest difference in means being 3.2) but, as far as one can estimate without independent means of assessing the mean IQs, have made possible fair comparison between the candidates from different school environments.

133. The order is completely reversed in the case of Arithmetic, Standard 6 pupils being highest but followed quite closely, especially in the case of the boys, by the private school candidates. The differences in means are here slightly larger and more significant, the (6-S) (boys and girls) differences attaining 1% significance. This reversal need not be regarded as an unfavourable reflection on the secondary school pupils; their curriculum is much broader and much more time is spent on other subjects that do not enter the elementary school timetable or else receive comparatively less attention there. Even within the limits of the subject of mathematics, comparatively more emphasis is laid on branches other than arithmetic and, certainly, there is not nearly so much time to devote to "drill" in the mechanical aspects of the subject. It is regretted that the analysis can not show how the three groups compared in the mechanical and problem sections of the test separately. In general, the comparative results in Arithmetic were as much to be expected as those in the Intelligence tests.

134. The group means in the English test reproduce the pattern of the IQ means, with the secondary school pupils in the lead but by a significant margin only in the case of the girls. Here, the greater amount of reading, especially reading for comprehension, that figures so largely in virtually all subjects of the secondary school curriculum, together with the more serious attention to the several aspects of language study and use, confers the greater advantage on the secondary school pupils. Then, too, even if they do no leisure reading, the greater amount of reading and of time devoted to it by secondary/

to it by secondary school pupils merely in doing homework, gives a greater verbal facility than is usual in the case of elementary school pupils. Indeed, one might have expected the difference to be greater but here again one can reasonably claim that the tests have compared the groups very fairly.

135. It is in the mean summed quotients where one expects the advantages, conferred by individual tests in favour of one group or another, to be smoothed out and this has in fact occurred with a slight, but not significant, balance in favour of the private school boys and the secondary school girls. Since the summed quotients were, in 1948, chiefly and, since 1948, exclusively* the final standard of judgement, it is satisfactory to observe, with respect to the fairness of comparison, that not one of the six differences between groups, both sexes, exceeded its own standard deviation, the highest value of t being .92 for girls (S-6) and .63 for boys (S-6).

136. It is the wholly unexpected and equally astonishing configuration of the class means in Essay and General Knowledge that the imagination finds most difficult to explain. In the Essay, the differences between the three girls' means were not large and the 6 mean was not quite significantly superior (at 5%) to the P mean; the (6-S) difference was negligible. But the 6 boys' mean was not only very significantly better than the P mean; it was almost significantly better than the S mean as well. Combining the 6, P and S means for boys and girls, the standard 6 candidates were significantly superior, not only to the private school candidates, but also to the secondary school pupils. Indeed, the mean score of the secondary school boys was not much better than the mean of the standard 5 girls; even when the latter was combined with the 3/4 girls' mean, thus enhancing the difference and decreasing its standard deviation, there could still be established no significant superiority of the secondary school boys over the three lower elementary school standards, the difference being no greater than its standard deviation.

137. This reversal/

* Essay and General Knowledge tests were discontinued in 1949.

137. This reversal of what one would expect is even more extreme in the General Knowledge test. Here both S means are 7 points lower than the 6 means, the differences being significant at 0.1%. The P means, while also significantly inferior to the 6 means, were better than the S means though not significantly so. Both S means were lower even than the general mean for all candidates including standards 3, 4 and 5. (This was also the case in Arithmetic, though less noticeably so, but not in the Essay.)

138. It is not easy to explain why the standard 6 candidates from the elementary schools should have been so much better in Essay and in General Knowledge than those candidates already attending secondary schools. The General Knowledge paper was an objective test chiefly resembling an academic "quiz" of comprehensive character (See Appendix 8 , page 181). The amount of non-academic knowledge, such as the controlled price of beef in Jamaica, was small. For the rest, one would suppose that familiarity with the several subjects of a secondary school curriculum would confer a decided advantage in answering the questions. Even more in the writing of essays, as in English, would one expect the secondary school pupils to be superior to elementary school candidates. All possible explanations have been conceived, some plausible others seemingly not possible; nevertheless they are all considered in the following paragraphs.

139. Did any candidates pre-view the Essay and General Knowledge test papers? One is given to understand that this is not uncommon in Jamaica but it is not a possible explanation in this case. Until a very few days before the examination, there was only one copy of each paper in the Island; the other copy of each was in England. The papers were not duplicated until, at the very last moment, it was apparent that the printed copies would not arrive in time. They were then put into sealed packets and despatched to Presiding Examiners immediately on the eve of the examination. In any event, a pre-view of an Essay paper is not necessarily helpful and it is not conceivable that such an unfair advantage would have been so selective or so extensive in its effect.

140. Was the marking biassed in favour of elementary school candidates? This is unthinkable and quite impossible. While a marker may be prejudiced/

be prejudiced in the marking of essays, the only way to give effect to prejudice in the marking of an objective test is the deliberate scoring of wrong answers correct and vice-versa. In any event, only candidates' names and index numbers, not schools, appeared on the Essay scripts. The marking of essays is notoriously difficult. A marker may give undue weight to such minor matters as spelling, punctuation and even writing, while giving little credit for content, originality and expression. ~~In such an event,~~ Thus, pupils whose strong points are these latter might be heavily marked down for deficiency in mechanical aspects. But this explanation, besides being very far-fetched, conflicts with the fact that the secondary school candidates proved themselves superior in the mechanical aspects (except writing) in the English test.

141. Another possible factor, specific to the Essay, is the short time of 20 minutes allowed for this paper. It is conceivable that, being trained in the habit of devoting time and care to the formulation of ideas and the planning of the essay before committing pen to paper, secondary school candidates might be embarrassed by such a brief allotment of time. If so, either they might have found themselves having only barely begun to write at the end of the time or, sensing that time was short, have attempted to write without due care and forethought.

142. Difference in ages was considered as a possible explanation, the Essay and General Knowledge means being raw scores. The mean ages of the three groups concerned, boys and girls separately, are shown in Table 23. It is seen that the differences of age, besides being very slight, are not

TABLE 23. MEAN AGES OF CANDIDATES BY SCHOOLS.

	Standard 6	Secondary Schools	Private Schools
Boys	3.8	4.0	1.7
Girls	4.5	3.2	0.4

Mean ages are given in months over 11 years 6 months, correct to one decimal place.

all of the same direction as the differences in Essay and General Knowledge means. The correlation with age of raw scores in the Essay and General Knowledge do not support this explanation. Only one of these departed significantly from zero while another was negative. The product-moment correlations/

correlations were (boys first): Essay, -.05 and .12; General Knowledge, .04 and .07.

143. The foregoing paragraphs have all attempted to explain away the observed differences. Another possible explanation is that they imply what they appear to imply, to wit, that the standard 6 pupils were in fact superior to the secondary school pupils both in essay writing and in General Knowledge. If this be true, it is cause for some disquiet, but a further explanation is that there were different degrees of selection among the three groups. For example, the standard 6 pupils may have been the best that the elementary schools could offer, whereas the secondary school candidates may have constituted an inferior sample of those schools' pupils. This explanation does not entirely remove the cause for disquiet nor does it agree with the reversed differences in Intelligence and English.

144. Finally, the observed differences may have been the effect of concentrated coaching of the elementary school candidates for the examination. It is believed that this was the chief factor, if not the only one. This is no more than an inference from the pattern of the means in all tests but is supported by, and was initially prompted by, the factorial analysis of the correlations between the six tests which is the subject of the next chapter. This would have the observed differential effect, as the secondary schools would have less interest, and far less time, to devote any special attention to the preparation of a small minority of their pupils for this examination. The position in the private schools is more obscure, as they are a mixed lot of elementary and secondary schools, which may or may not have been anxious for their pupils to gain scholarship awards.

145. It is well established by research that coaching is chiefly effective in tests of attainment and it is in the attainment tests, with the exception of English, that the superiority of the Standard 6 pupils is evident. It is reasonable to suppose that, in English, the greater coaching of the elementary school candidates was sufficient only to counteract, but not to reverse, the advantage of the secondary pupils described in paragraph 134. It was mentioned in that paragraph, too, that one might reasonably have

expected/

expected the superiority of the secondary school pupils to have been greater than it was.

146. The Essay and General Knowledge were the only tests which had been carried over to 1948, in identical form, from previous years and in which previous years' papers were made available to teachers. There had previously been an Intelligence Test but teachers were not allowed to have copies, for the express reason of discouraging coaching. Both the form and, in many respects the content of the English test differed from previous years and coaching for this test may be supposed to have had less effect. On the other hand, an Arithmetic test remains much the same however novel the presentation which, in fact, did not differ greatly from that of earlier years. The deliberate restriction of the content of the Arithmetic test (See paragraph 65, page 42) would also tend more to the advantage of the elementary than the secondary school candidates. That coaching in essay writing could have any great effect may be doubted; but if the topics for composition can be anticipated - and all were fairly stock subjects - a model essay can be prepared and largely committed to memory.

147. Analysis of the 1949 Scholarship results will furnish an interesting comparison with those just described but for the four ERU tests only, as the Essay and General Knowledge papers were discontinued that year. It is hoped that more instructive evidence, relative to the argument of the last three paragraphs, will be forthcoming from the experiment to measure the effects of practice and school experience, carried out in an elementary school and a neighbouring secondary school, with pupils of both sexes ranging from 10 to 14 (See paragraph 59, page 38).

CHAPTER 12 LSE/48: FACTOR ANALYSIS OF INTERCORRELATIONS OF TESTS

148. The product-moment correlations among the six tests were calculated for boys and girls separately; they appear in Table 24.

Table 24. LSE/48: INTERCORRELATIONS OF SIX TESTS

		Intelligence (T)	Vernier (V)	Arithmetic (A)	English (E)	Essay (C)	General Knowledge (K)
Vernier	(V)	.8654 (.8735)					
Arithmetic	(A)	.7065 (.7023)	.6709 (.6867)				
English	(E)	.8352 (.8422)	.8108 (.8243)	.6185 (.6601)			
Essay	(C)	.5016 (.4634)	.4172 (.4592)	.4809 (.4261)	.5577 (.5482)		
General Know.	(K)	.6663 (.5747)	.6469 (.6016)	.5884 (.6120)	.7237 (.6717)	.6268 (.5292)	
Mean	Boys	.7150	.6822	.6130	.7092	.5168	.6504
	Girls	(.6912)	(.6891)	(.6174)	(.7093)	(.4852)	(.5978)

Explanation Boys: Upper of each pair of correlations (N= 406)

Girls: Lower of each pair of correlations (N= 587)

In general, the correlations for boys and for girls agree quite closely, especially within the ERU battery i.e. the first six entries. The greatest difference, but which (transformed to z) is not as great as its standard error, is between the pair of correlations between Arithmetic and English. There is a difference of like magnitude between the correlation of Arithmetic with the Essay while the difference between the correlations of Arithmetic with General Knowledge is more nearly significant. The only significant differences (P= .05) are between the pairs of correlations of General Knowledge with Intelligence and the Essay/

Essay. These differences correspond with the greatest differences in mean score between the sexes i.e. highly significant superiority of girls in English and Essay and the superiority (non-significant) of boys in Arithmetic and General Knowledge.

149. The mean correlation of the Vernier test is virtually as great as that of the Intelligence test in spite of being only half as long (50 as against 100 items) and occupying only half the time (30 as against 60 minutes). The closeness of the correlations of Intelligence and English is due in some measure to the greater length of the English test (120 items). The number of items in the General Knowledge test was 70 while the Essay was scored out of a maximum of 30 and occupied only twenty minutes. It is surprising that the English test should correlate more highly with General Knowledge than it does with the Essay. Another point of interest is that, in the case of the girls, General Knowledge is correlated less highly with all the other tests, except Arithmetic, than in the case of the boys.

150. The centroid method was first applied to the analysis of both correlation matrices given in paragraph 148 and approximate loadings in two factors obtained. Using the communalities calculated from these first approximations to the factor loadings, the centroid analysis was repeated and second approximations thus obtained. Both in the boys' and the girls' matrices the signs of Essay and General Knowledge were changed in the first residual matrix, thus giving them second factor loadings of opposite sign to the four ERU tests. Resorting then to Lawley's method of analysis, and using these second approximations but with unit communalities, two iterations were performed. Using the resulting fourth approximations, the existence of a third factor was tested for

significance/

significance and, in both cases, the value of P was found to be far below 0.001. Accordingly, loadings in this third factor were arrived at by the centroid method. In so doing, the signs of English and Composition were changed in the case of the girls; in the case of the boys the signs of English, General Knowledge and the Vernier test were changed. Objection was raised to the resultant effect of opposing the signs of the two intelligence tests in the loadings of this third factor for the boys, but it was inevitable.

151. The analysis was then continued by the Lawley method and seemed to go on interminably so that, when the girls' factor loadings, especially the third, finally settled down satisfactorily, Factors I and II had been iterated ten times and Factor III nine times. This is believed to be associated with very high loadings in half of the tests in the first factor which, in turn, probably derived from the inclusion of two very similar intelligence tests in a small battery. Iteration in the case of the boys was an even more lengthy process, Factors I and II being iterated thirteen times and Factor III changing relentlessly to the sixteenth iteration. This latter fact seems to have been associated with the negative sign of the Factor III loading of Vernier for, in the process of iteration, the successive approximations of the loadings of Intelligence and Vernier drew progressively closer until the sign of the latter changed finally from negative to positive. Whereas the approximate third factor loadings of these two tests originally differed by 0.1890, the final loadings differed by only 0.0369. On account of this fact, the earlier calculations were checked ad nauseam for the error indicated but none was found.

152. The unrotated factor loadings, as derived from the iterative process, the total variance of all six tests accounted /

accounted for by each of the three factors and the communalities of the six tests are shown, for boys and girls separately, in Table 25. The several loadings for boys and girls are almost identical except in the second factor. None of the pairs of loadings of the four ERU tests in the first factor differ by more than 0.01 or by more than 0.03 in the third factor. The loadings of the Essay and General Knowledge in Factors I and III do not agree quite so closely but only one of the four differences is significant at 5% i.e. the loadings of the Essay in Factor III. The differences of the loadings of General Knowledge in both I and III (0.07 in each case) just exceed their standard errors as calculated from Lawley's formula. Quite the reverse is the case with the loadings of all tests in Factor II, all the differences except one being significant and highly so in most cases. In English the difference was as great as its standard error, in Intelligence and Arithmetic the differences were significant at 5% (in Arithmetic, $t = 1.96$) while in the Essay, General Knowledge and Vernier, t was as great as 4 or more. Another point of note is that the loadings of English in the unrotated Factor I were as great as those of the two intelligence tests, the slight excess (0.02 - 0.03) in the case of ordinary Intelligence being negligible compared with its standard error. This was possibly associated with the fact that the battery chiefly consisted of tests of a verbal character and that, in a community where the educational standard is not high, verbal facility is the most outstanding attribute of intelligence with which it is very highly correlated.

Table 25/

TABLE 25 UNROTATED FACTOR LOADINGS

			I_o	II_o	III_o	h^2
Intelligence	(T)	Boys	.93	--.11	.05	.8788
		Girls	(.94)	(-.17)	(.02)	(.9164)
Vernier	(V)	Boys	.91	--.21	.01	.8626
		Girls	(.91)	(-.09)	(.02)	(.8391)
Arithmetic	(A)	Boys	.75	.04	.33	.6692
		Girls	(.76)	(.13)	(.30)	(.6894)
English	(E)	Boys	.91	.05	--.19	.8699
		Girls	(.91)	(.08)	(-.16)	(.8669)
Essay	(C)	Boys	.59	.56	.07	.6771
		Girls	(.55)	(.31)	(-.12)	(.4139)
General Knowledge	(K)	Boys	.77	.30	--.02	.6830
		Girls	(.70)	(.48)	(.05)	(.7250)
Variance		Boys	4.02	0.47	0.15	4.6406
		Girls	(3.92)	(0.39)	(0.13)	(4.4507)
Percentage		Boys	67.01	7.83	2.50	77.34
		Girls	(65.3)	(6.50)	(2.17)	(74.18)

153. To rotate Factors I and II, some hypothesis concerning the nature of II was clearly necessary; it did not resemble, at all closely, any other factor commonly met with in factorial work. It opposes the two intelligence tests, whose loadings are fairly alike, to the Essay and General Knowledge, with fairly high loadings, at the other extreme. In between, are the other two ERU tests, Arithmetic and English, with fairly similar loadings. This remarkable pairing off, with English and the Essay by no means similar as one might expect them to be, and with the two intelligence tests at the lowest extreme, scarcely justifies the interpretation of this factor as v. Were one to change the signs, this interpretation is still not justified as one would then have the anomalous situation of Arithmetic having as high

a loading

a loading in v as English, while the Essay would be left with zero or near zero loadings.

154. The only plausible interpretation appeals to the familiarity of the candidates with the types of test or their experience of the six "subjects" in school. Even this does not explain why English, and still less Arithmetic, should be so much lower than the Essay and General Knowledge. Finally, the interpretation of this factor as the amount of coaching the pupils received for the examination was decided upon. This decision was based chiefly on the facts that:

a. The Essay and General Knowledge were the only two papers carried over, in familiar form, from previous years;

b. The Arithmetic and English papers were novel in form but not entirely in content and this would not entirely neutralize the coaching for these two tests;

c. The two intelligence tests were novel in form and largely in content and, in any case, intelligence tests of previous years were not available to teachers.

In accordance with this interpretation, Factors I_0 and II_0 were rotated orthogonally so that I_1 was equidistant from tests V and T (Vernier and Intelligence) giving these two tests negligible loadings in II_1. The implication that the two intelligence tests were immune to the effects of coaching is very dubious but any loading that they may be given, by a different angle of rotation, must be purely arbitrary.

TABLE 26

TABLE 26. ROTATED FACTORS: TWO ALTERNATIVES

		FIRST ALTERNATIVE				SECOND ALTERNATIVE			
		I_{2a}	II_1	III_{1a}	h^2	I_{2b}	II_1	III_{1b}	h^2
Intelligence	Boys	.91	.05	.24	.88	.87	.05	.35	.88
	Girls	(.93)	(-.03)	(.20)	(.92)	(.89)	(-.03)	(.35)	(.92)
Vernier	Boys	.91	-.05	.20	.86	.85	-.05	.38	.86
	Girls	(.89)	(.05)	(.19)	(.84)	(.85)	(.05)	(.33)	(.84)
Arithmetic	Boys	.65	.16	.47	.67	.80	.16	.00	.67
	Girls	(.66)	(.24)	(.44)	(.69)	(.79)	(.24)	(.00)	(.69)
English	Boys	.91	.21	.00	.87	.73	.21	.55	.87
	Girls	(.91)	(.22)	(.01)	(.87)	(.76)	(.22)	(.49)	(.87)
Essay	Boys	.46	.66	.16	.68	.47	.66	.14	.68
	Girls	(.51)	(.39)	(-.02)	(.41)	(.41)	(.39)	(.30)	(.41)
General Know.	Boys	.70	.43	.13	.68	.63	.43	.31	.68
	Girls	(.60)	(.58)	(.17)	(.73)	(.59)	(.58)	(.19)	(.73)
Variance	Boys	3.58	0.69	0.36	4.6406	3.26	0.69	0.68	4.6406
	Girls	(3.56)	(0.60)	(0.30)	(4.4507)	(3.26)	(0.60)	(0.59)	(4.4507)
Percentage	Boys	59.72	11.57	6.06	77.34	54.38	11.57	11.39	77.34
	Girls	(59.27)	(9.98)	(4.93)	(74.18)	(54.31)	(9.98)	(9.89)	(74.18)

155. It remained to decide whether Factor III, which opposed Arithmetic and English to each other, should be interpreted as a number Factor, n, or as the verbal Factor, v. Rotations to comply with both of these interpretations were performed and appear in Table 26. The following arguments are adduced as evidence in making this decision:

a. The largest and only significant difference between the loadings for boys and girls in this factor lies in the Essay: it is not clear how a number factor would cause this.

b. The first alternative leaves English with as high loadings in I_{2a} as the two intelligence tests. This could be overcome by regarding I_{2a} as gv but this does not conform with the low loadings of the Essay in this factor. The second interpretation removes this anomaly although it gives Arithmetic unseemly large loadings in I.

c./

c. The interpretation of III as n gives the Essay a higher loading in n than General Knowledge and nearly as high as Vernier; this is indefensible.

d. On the other hand, the Essay has not as conspicuously high loadings in v as one might expect, especially in the case of the boys. This may be explained by arguing that coaching contributed more to success in the Essay than verbal facility, ~~that coaching was a more potent factor~~ especially in the case of the boys.

e. There is more reason to expect the intelligence tests, General Knowledge and the Essay to contain a verbal factor than ~~whereas it is not so reasonable~~ to look for a number factor in these tests.

For these reasons, the second alternative was adopted, interpreting the three Factors as (I) g tinged with n, (II) the coaching factor and (III) the verbal factor, v.

156. This leaves only a small part of the variance of the two intelligence and English tests to be accounted for by specific factors. Arithmetic, the Essay and General Knowledge each have higher specific factors, with loadings approaching 0.6, except in the case of the girls' Essay which has a specific factor loading approaching 0.8. It is also seen from Table 26 that, in the preferred (second) alternative rotation, Factors II and III account for the same amount of the total variance i.e. 10%-11%, while the first factor accounts for more than half. All three factors account for three-quarters of the total variance. This proportion is rather less in the case of girls than boys, due chiefly to the high specific loading in girls' Essay and to the high loading in the coaching factor in the boys' Essay. The Essay has a higher loading in Factor III in the case of the boys than of the girls, where this is regarded as n, but the reverse is the case (the signs of the unrotated loadings having been changed) where the third factor is interpreted as v./

as v. There is a corresponding reversal in the loadings of the Essay in g.

157. The identification of Factor II with the effect of coaching was subsequently supported by comparisons of the school means already described in Chapter 11. It may now be pointed out that the superiority of the Standard 6 means, which are presumed to be those chiefly enhanced by coaching, is particularly evident in those tests which are now seen to have high loadings in Factor II i.e. Essay and General Knowledge. The absence of this superiority in the girls' Essay means (see Table 22, page 94) corresponds with a significantly lower loading (.39) for girls than for boys (.66). Further, although the magnitude of ~~6-S~~ 6-S (girls) difference in means in General Knowledge is only slightly greater than the corresponding difference for boys (.7.24 compared with 6.94), yet it is much greater in relation to its standard error (t =4.41 compared with t = 3.72). This difference between the differences corresponds with the significantly higher loading of General Knowledge in Factor II for girls than for boys (.58 against .43). A similar agreement exists in Arithmetic and English, though the differences between the differences of means and the differences between the loadings, for boys and girls respectively, while of like sign are not sufficiently large to be very conclusive.

158. One may question the fact that the very significant superiority of standard 6, both boys and girls, in Arithmetic is not matched by very high loadings of this test in Factor II while, in English, where the loadings are as high as in Arithmetic, the advantage is with the secondary school candidates. One is left to conclude that the superiority of standard 6 in Arithmetic is real and not due solely to the effect of coaching though it may have been enhanced by it (cf. Tables 3 and 4, page 117). That this is not at all unlikely is explained in paragraph 133, page 96 . In English, on the other hand, one presumes that the superiority of the secondary school pupils has been reduced but not cancelled by the coaching effect, on account/

account of the high loading of this test in v, Factor III, which, as described in paragraph 134, confers the greater advantage on the secondary school pupils. The verbal factor does not confer the same advantage on the secondary school pupils in Essay as its loadings in v are not so high, with the exception of the girls, mentioned in paragraph 157. It will also be remembered (paragraph 65, page 41) that a deliberate attempt was made, in the construction of the Arithmetic and English tests, to minimize the effects of coaching. The comparatively high loadings of the two intelligence tests in v, Factor III, coupled with their zero loadings in Factor II, leave the balance of advantage with the secondary school pupils in these tests.

159. The significant sex differences in the loadings in Factor II are not necessarily due solely (or even at all) to sex. They may simply be functions of the difference in the amount of coaching between the elementary and secondary schools, for the girls were more predominantly elementary school pupils than were the boys (see paragraph 100 and Table 8, page 66). There is no means of ascertaining whether there are any real sex differences (in the factor loadings) with the data as classified at present. It would be necessary to compute a new set of correlations with the proportions of girls and boys from the several schools more nearly equal.

160. Finally, the effect of coaching should be to decrease the standard deviation as well as increase the mean in the coached group. This effect was observed only in the Essay (see paragraph 130, page 93) where the SDs of scores in standard 6 (boys : 3.03, girls: 3.01) were lower than in secondary schools (boys: 3.92, girls:3.20) and private schools (boys: 3.63, girls: 3.50). However, the (S-6) and (P-6) differences in SDs were significant or approached significance in the boys

boys only (t = 2.69 and 1.57 respectively, the corresponding values in the case of girls being t =1.43 and 0.61). This difference between the sexes is matched by the higher loading of Essay in Factor II in the case of boys (0.66) than girls (0.39). There were differences of like direction but less magnitude in General Knowledge, except in the case of (S-6) girls where the SD for S was less than for 6. However, the S girls' mean was so low as to make the distribution slightly skewed.

Chapter 13. Follow-up of 1948 Local Scholarship Candidates

161. As described in paragraph 55, the co-operation of the grant-aided secondary schools was sought at the beginning of 1949, with the aim of administering the same battery of tests used in the Scholarship examination, to all new entrants of ages 10:0 to 13:11. At the same time many Heads wished to include all new entrants of whatever ages and also pupils of these and other ages whether new entrant or not. Two schools asked for all their pupils to be tested. In all, there were 1264 children tested, of whom 1101 were new entrants. In addition, there were 281 new entrants who were not tested, chiefly on account of being beyond the age limits but, in a few cases, through absence on the day of the tests.

162. In addition to the test results, Heads supplied information about individual pupils under the following headings:

(a) Whether new entrant or not;
(b) Age and sex;
(c) Parish of birth and residence;
(d) Previous school attended;
(e) Occupation of parent;
(f) Whether Jamaican born or of Jamaican parentage.

Many Heads also submitted, at the end of one Term, their own predictions of their new entrants' likely success in secondary school, taking, as a uniform criterion, success in the Cambridge Local Examinations, as follows:

A: Potential university scholarship winners and university entrants passing the Higher Certificate with outstanding merit;

B: Potential Higher Certificate material but without exceptional distinction;

C: Should pass School Certificate with little difficulty but not likely to attain Higher Certificate standard;

D: May pass School Certificate eventually but extended course or repeated attempt likely to be necessary;

E: Should pass Junior Certificate but unlikely to attain School Certificate standard;

F: Lower standard than E.

The method/

The method of assessment was left to Heads but they were asked to consider all factors contributing to academic success, e.g. industry as well as intelligence, but not factors over which the pupil had no control, e.g. health, family circumstances etc. So that these assessments would be quite independent of the test results, Heads were asked to submit them before receiving the results of the testing and without regard to the Local Scholarship examination results.

163. The follow-up cannot be completed until 1954, sooner or later, by which time the new entrants in 1949, including those who took the Scholarship examination in 1948, will have completed or nearly completed their secondary schooling. To give some guidance to Heads in their interpretation of the Local Scholarship results in 1949 and subsequent years, a preliminary analysis of the test results was made in the light of the school assessments of likely success. The report of this analysis, in the form of a circular letter (SSS/C4 of the 16th of November, 1949) forms the rest of this chapter. Attention is drawn especially to the close similarity between the 1948 and 1949 LSE means (this being the only analysis of the 1949 Scholarship results that has been possible thus far) and also the close similarity between the means of the LSE candidates and those of the secondary school pupils (see Tables 3 and 4 of the circular).

Ref: SSS/C4

Education Research Unit,
Mandeville.

CONFIDENTIAL

16th November, 1949.

Dear

Jamaica Follow-up : 1949

(164)# On the basis of the assessments made by 14 Schools, together with the performance of the same pupils in the ERU Tests, it has been possible to compute the equivalence between the two distributions. 189 boys and 304 girls, mostly, but not all, within the age-range 10:0 - 13:11, are involved.

(165) 2. It seems that the categories D and E were not sufficiently mutually exclusive. Commenting on E, one Head wrote: "..... in my experience in this School, no pupil who has been "successful in the Junior Cambridge Examination has failed in the "School Certificate Examination whereas several, who failed the "Junior, have passed School Certificate, some obtaining Grades I "and II. You will therefore find no pupil graded as E." Other evidence points to overlapping between the two categories and, for this reason, and because the Junior Examination in any case need no longer be considered, categories D and E have been coalesced to form the troublesome but ever-present category of "border-line cases" (DE).

(166) 3. With this exception, the categories were fairly distinct and a fair measure of uniformity was observed in the proportions of pupils allocated to the several categories. The following Table gives a comparison between boys and girls:

TABLE 1(27)# PERCENTAGES OF PUPILS (BY SEXES) ALLOCATED TO CATEGORIES

Category	A	B	C	DE	F	Total
Boys	3.2	20.1	43.9	31.2	1.6	100.0
Girls	2.0	23.7	34.5	34.2	5.6	100.0

(167) 4. The results were dealt with as follows:

(a) Raw Scores on ERU Tests were converted into Quotients;
(b) Quotients were totalled for individual pupils;
(c) Pupil-totals were assigned to the several categories in accordance with school assessments;
(d) (c) was repeated for individual test quotients;
(e) Means and standard deviations of the quotients in the several categories were calculated.

Note that the pupil-totals, as they include two intelligence quotients, are weighted equally in favour of potential ability (Intelligence) and realized ability (Attainment). These results are shown in Table 2.

TABLE 2(28) MEANS AND SD's OF QUOTIENTS BY TESTS, TOTALS AND SEXES

		A	B	C	DE	F
Intelligence	Boys	130 (9)	117(11)	107(11)	99(10)	84(13)
	Girls	124(10)	118(12)	112(11)	104(10)	92 (7)
Supplementary	Boys	137 (8)	120(11)	111(11)	103 (8)	94(22)
	Girls	131 (9)	121(11)	113(11)	107(12)	93(11)
Arithmetic	Boys	131(13)	110(11)	104(10)	97 (8)	86 (7)
	Girls	110 (2)	109(12)	102 (9)	97 (9)	87 (6)
English	Boys	134 (7)	115(12)	106(10)	99(10)	84 (5)
	Girls	118(12)	118(12)	112(10)	106(10)	94 (9)
Pupil-totals	Boys	531(35)	463(39)	427(35)	398(31)	347(47)
	Girls	482(28)	466(40)	439(36)	415(39)	366(28)
	Both	507(40)	465(39)	434(37)	409(35)	363(31)

The figures in brackets are the SD's of the means they follow.

Numbers in brackets preserve continuity of numbering from previous paragraphs and tables.

(168) 5. While the mean is the point towards which the scores show a tendency to converge, the SD (Standard Deviation) is a measure of the extent to which the scores diverge from that point. Appreciation of the relative magnitude of an SD can be obtained from the fact that, presuming the distribution to be "normal", then one-third of the scores will be found between the mean and 1 SD above it and another one-third between the mean and 1 SD below it. The remaining one-third of the scores will diverge from the mean by more than 1 SD in either direction i.e.one-sixth at the high end and one-sixth at the low end of the distribution.

(169) 6. All ERU Tests are so standardized as to give quotients whose mean value is 100 and whose SD is 15. This means that two out of six quotients will lie between 100 and 115, two more will lie between 85 and 100, while one will exceed 115 and the sixth will be less than 85. It is also useful to remember that the top 5% of the population will have quotients 125 or greater while the bottom 5% will have quotients 75 or less. These remarks refer to a complete population of the age-group and not merely to the sample which was included in the follow-up.

(170) 7. It is obvious, therefore, that there is considerable overlapping at the margins of the several categories. For example, the mean for category B, both sexes, is 465 and the SD is 39. Assuming a normal distribution (which, incidentally, is not here a completely justifiable assumption) one-third of all the pupil totals in this category would range up to 504 which is just short of the mean for category A. But one-sixth of the category B pupil-totals may exceed 504 i.e. some of the B totals will exceed the mean total for category A. At the same time, one-third of the scores in category A range down to 467 (507 - 40)which is just short of the B mean, while some of the A scores will be less than the B mean. This overlapping will cause no surprise as it simply reflects (a) the difficulty of predicting a pupil's likely success in a 5-year course at the end of only one term of it and (b) the fact that success depends upon factors, such as industry, other than those which the objective tests purport to measure and (c) ability is a "continuous" variable defying classification into water-tight categories. Similar overlapping takes place between other categories.

(171) 8. You may question the magnitude of these category means. For example, the potential university scholarship winners have a mean of only 507 i.e. an average of only slightly more than 125 in each test. Does this imply that 5% of the whole population could pass the HSC with outstanding merit, being potential university scholarship material? I have already warned of the unsatisfactory nature of the standardization of this battery of tests. Evidence from the Survey in June and the Follow-up now points to the fact that, while the age allowance has proved to be satisfactory, the mean of 100 was established at too high a level because the sample on which the tests were standardized was not representative. (In fact the sample was not real at all, but a hypothetical one only.) Until such time as the battery can be standardized on a truly representative sample (in January 1950), these quotients will suffice for comparative purposes and will be directly comparable with the results of the 1949 LSE.

(172) 9. In the belief that these results would be most useful to you in the form of limits between categories rather than as means of categories, I have computed certain values which are equidistant (in units of SD) from the means of adjacent categories. They are:

A	B	C	DE	F
486	449	421	385	

In making use of these limits, the degree of overlapping should be borne in mind. Thus, a pupil whose quotient-total lies between 421 and 449 would not necessarily be assessed as C but the most probable assessment would be C. He may be assessed as either B or DE but there is less probability of this. Even the probability of an A or F assessment cannot be excluded.

(173) 10. The means and SD's by tests and by sexes but not by categories are shown in Table 3.

TABLE 3 (29) MEAN QUOTIENTS FOR ALL PUPILS BY SEXES AND BY TESTS

	Intell-igence	Supple-mentary	Arithmetic	English	Total
Boys	107.2(13)	110.7(13)	103.2(12)	106.2(13)	427.3(47)
Girls	109.8(13)	112.2(13)	101.5(11)	110.4(12)	433.9(45)

The figures in brackets are the SD's of the means they follow.

The difference (6.6) between the totals is not quite large enough to be considered statistically "significant". This means that it is within the bounds of reasonable probability that such a difference could have arisen purely by chance alone through "sampling error" and therefore it may not be presumed that the girls are better than the boys. For example, the probability is 1 in 8 that this particular difference could be due to chance alone. Any probability greater than 1 in 20 is rarely regarded as significant. Similarly, the differences between the Supplementary and the Arithmetic means are not significant. On the other hand, both in Intelligence and English, the girls are significantly better than the boys. Here, the probabilities that such differences could have arisen by chance alone are 1:30 and, in English, as low as 1:3,000.

(174) 11. For interest's sake, the LSE means are also given both for 1948 and for 1949 in Table 4.

TABLE 4 (30) MEAN QUOTIENTS FOR LOCAL SCHOLARSHIP CANDIDATES

		Intell-igence	Supple-mentary	Arithmetic	English	Total
1948	Boys	109.2(12)	109.5(12)	106.3(11)	107.5(10)	432.5(?)
1948	Girls	109.9(11)	109.3(12)	106.4 (8)	110.6(10)	436.2(?)
1948	Both	109.6(12)	109.4(12)	106.3(10)	109.3(10)	434.6(?)
1949	Both	109.6 (?)	109.6 (?)	106.5 (?)	108.6 (?)	434.3(?)

The figures in brackets are the SD's of the means they follow.
(?) indicates that the SD is not yet available.

With one exception, there are no significant differences between any of these means. The sex-difference in English is so highly significant that the probability that a difference as large as this could be due to chance alone is as low as 1:200,000.

(175) 12. The fact that the mean performance in Arithmetic is consistently poorer than in other tests may later be adjudged significant but, at the moment, such a conclusion is not justifiable. The difference may be only an artifact of the existing standardization.

(176) 13. I hope that this interim analysis of the follow-up data will be of some service to you in interpreting this year's LSE results. If I can be of further assistance in explaining any doubtful points more fully, I shall be pleased to do so.

With sincere thanks for your co-operation that has made this analysis possible,

Yours sincerely,

A. Deanne Eggs.

Education Research Officer

PART IV

CONCLUSION AND APPENDICES

PART IV. CONCLUSION

Chapter 14. Summary

177. (Chapter 1). This research was sponsored by the Colonial Social Science Research Council and financed by grants of over £10,000 from Colonial Development and Welfare Funds. An initial training period at Moray House, Edinburgh University, was followed by field-work in Jamaica and some other British Caribbean Colonies; a final Term was spent at Edinburgh. The whole project, which lasted five years, was supervised, in its academic aspects, by Professor Sir Godfrey Thomson, D.C.L.,D.Sc.,Ph.D. The research was conducted by A. Deans Peggs, M.Sc.,M.Ed., Colonial Education Service, who was granted leave for the purpose from the post of Head Master of the Government High School, Nassau, Bahamas.

178. (Chapter 2). Jamaica, the largest of the British West Indian Islands has almost one half of the British Caribbean population of three millions. It is an extremely mountainous tropical island whose climate, topography and communications are diversified and dominated by its mountains. Predominantly an agricultural country, the Colony owed its eighteenth century prosperity to sugar and slaves and, to the same one-crop slave economy, it also owed its nineteenth century economic distress and its twentieth century social problems. Industries are few and young; its people many and poor. Housing, health and home life are generally bad; literacy and standard of education low.

179. (Chapter 3). Dual control in education has had its day; the churches can no longer keep pace with the financial demands of providing schools, many of which are in shocking condition and badly equipped. Government pays all salaries. Recent enormous increases in expenditure have been largely helped by Colonial Development and Welfare Funds. Universal elementary education is not an accomplished fact nor, in face of the/

of the alarming increase in population, does it seem likely to be. Dispersion of the population, the ignorance, poverty and lack of co-operation of the parents, and the generally low acquirements of teachers multiply the problems of education and depress its standards. However, there is a variety of types of education not elsewhere found in the Caribbean, although the supply is inevitably restricted. A recent Commission to enquire into secondary education made several constructive suggestions, the implementation of most of which will depend on the money available. The University College is a joint West Indian venture aided by funds from the Home Government. External London degrees and a diversity of institutions testify to an awakening desire, not only for formal education, but for culture in a wider sense.

180. (Chapter 4). The programme of research began with, and grew out of, the construction of tests of intelligence and attainment for use in awarding scholarships and in selection for secondary education. Both verbal and non-verbal tests were constructed and the former were immediately pressed into service in the annual Local Scholarship Examination. Two short adult tests were also constructed and used in Training College Entrance Examinations. A follow-up experiment was begun on the first candidates to take these tests, whether successfully or unsuccessfully. The field-work of several other experiments was completed, including an Educational Survey in Jamaica and a second embracing several other colonies as well. An experiment to assess the relative effects of practice, incentive and experience and another attempting a factor analysis of abilities were also begun.

181. (Chapter 5). The corrupt form of English universally spoken and the low standard of education created difficulties in several aspects of test construction.

Infinite/

Infinite care was taken to reduce the effect of these and other extraneous factors to a minimum but some, especially the generally low standard of education, defied attempts to surmount them. The accumulation of adverse circumstances conspired to make the construction of tests an extremely tedious, laborious and, in one respect at least, erratic business. But the experience gained should stand in good stead for the future. Items were selected for inclusion in tests on the strength of pupils' performance in them; their facility and power of discrimination were the two chief criteria, together with freedom from ambiguity. For the special purpose of the Education Department, a vernier test of intelligence was constructed as well as an all-range test and two tests of attainment in English and Arithmetic. Three such batteries were constructed though only two have so far been standardized. Elaborate instructions for administration of tests were prepared so that departmental personnel can undertake the field-work of future examinations and research. Statistics of the tests of Battery 2, given at the end of Chapter 5, show wherein the efforts at test construction were successful and in what respects they erred.

182. (Chapter 6). Technical aspects of drawing and duplication were the most formidable obstacles encountered in the construction of the non-verbal tests. Otherwise, their construction resembled that of the verbal batteries, except that it was even more laborious and protracted. In the course of this work, a new type of non-verbal item was devised; it is described in an article published in the General Section of the British Journal of Psychology, 1951.

183. (Chapter 7). The construction of the adult tests of intelligence followed the same pattern as the 11+ tests but received much less time and attention. They were administered to several adult groups whose mean scores are tabulated/

tabulated in Appendix 7.

184. (Chapter 8). The Local Scholarship Examination is an administrative attempt to bring unity and coherence into the system of awarding 700 scholarships and selecting for admission to 26 secondary schools. It is used by several Trusts as well as the Department, the Schools Commission and a majority of the schools themselves, but its use is not obligatory. The variety of awards available is described, together with recommendations of the Secondary Education Continuation Committee. These latter, if fully implemented, will demand changes in the tests themselves as well as in the administration of the examination. In 1948, 1000 candidates took the examination at sixteen parish centres. The Research Unit undertook a large share in the organization of the examination as well as the construction of tests.

185. (Chapter 9). An analysis is made of the number, source, age and score of these candidates. It was found that the relative number of candidates, based on school attendance for the previous year, varied highly significantly from parish to parish and was positively correlated with literacy and school enrolment as revealed by the 1943 Census. The greatest number came from Kingston and the urban parts of St. Andrew and St. James; the majority of the remainder came from larger towns and villages. A disproportionate number of candidates were girls, who also received a disproportionate number of awards. This excess of girls was peculiar to ~~secondary~~ elementary schools which supplied 71% of all candidates. In general, children do not avail themselves of both opportunities to take the examination, at 11 and 12, which the official age-limits allow. There is also a tendency for the younger children in a year-group not to be presented as candidates at all. The score distributions in the four ERU tests showed a marked negative skewness; these are compared with those from the Jamaica Survey, 1949, which are positively/

positively skewed, and with those of the hypothetical sample, who worked the drafts, which are rectangular. This illustrates the extreme difficulty, if not the impossibility, of constructing tests in Jamaica which will adequately cover all ranges of ability and attainment.

186. (Chapter 10). A geographical analysis of the results shows a stronger tendency to take the examination among migrant population than among natives or non-migrants. Further observations on migration lead to the inference that migrants are of relatively high mental calibre and that parishes with a high emigration rate would consequently deteriorate. Twenty-eight analyses of variance were carried out. One of these, on summed quotients in the ERU battery is described in detail; the results of the others are summarized. All show highly significant variation between parishes but the mean square between parishes of residence is greater than that between parishes of birth. This suggests that the differences are environmental rather than innate. Following the analysis of variance in each case, the mean for each parish was compared with the Island mean. These results are discussed parish by parish and lead to the final conclusion that candidates from the parishes in the east end of the Island were better than those from the west and that, in the middle, northern parishes were better than southern parishes.

187. (Chapter 11). Boys were slightly superior to girls in Arithmetic and General Knowledge while the girls were superior in English and the Essay; only the girls' superiority was significant and there was no sex difference in intelligence. There were a few candidates from standards 3, 4 and 5 of elementary schools; while these were, in average, significantly inferior in all tests to the Island mean, yet there may be some justification for transference direct to a secondary school from an elementary standard lower/

lower than 6. Secondary school candidates were superior to both private school and standard 6 candidates in the two intelligence tests and in English; only the girls' superiority was significant. Standard 6 candidates, boys and girls separately, were very significantly superior, in Arithmetic, to secondary school candidates and, in General Knowledge, to both secondary and private school candidates. Standard 6 boys and girls together were significantly superior to both secondary and private school candidates in the Essay. Of several possible explanations for this unexpected superiority, the effect of concentrated coaching of elementary school candidates is considered the most likely. Arguments are put forward in support of this view. It is felt that the summed quotients in the four ERU tests are a reasonably fair standard of judgement as these exhibit no significant school or sex differences and are least subject to the influence of coaching. This was actually the standard used in awarding scholarships in 1949 and thereafter. ~~with Essay and General Knowledge a secondary consideration.~~

188. (Chapter 12). Intercorrelations of the six tests were calculated for boys and girls separately. There were two significant differences between pairs of correlations for boys and girls; both of these concerned the correlations of General Knowledge with other tests. Two factors were first taken out using the centroid method followed by Lawley's iterative process. A third factor was found to be significant and iterated, with the other two, from nine to sixteen times. The loadings for the two sexes in Factors I and III did not differ significantly except in one instance; all the pairs of loadings in Factor II did differ significantly except in one instance. The latter factor was interpreted as the effect of coaching and evidence is adduced in support of this. Two alternative rotations of the third factor lead to its identification as v rather than n./

than n. The loadings of the tests in the coaching factor are then discussed in the light of the sex and school differences revealed in the preceding chapter. It is concluded that the superiority of the elementary school (standard 6) candidates in Arithmetic is real and not due solely to coaching while the secondary school pupils have superior verbal facility. The sex differences in loadings in Factor II may be ascribed to differences between schools and not necessarily to sex at all.

189. (Chapter 13). In a follow-up experiment, 1264 pupils were tested at all the grant-aided secondary schools, 1101 of whom were new entrants in January, 1949. Only 215 of these had taken the Local Scholarship Examination the previous year. Heads supplied collateral information about each pupil including an assessment, made at the end of one Term, of each pupil's likely success in secondary school. This experiment cannot be completed until about 1954 but an interim analysis was performed in 1949 for the guidance of Heads in interpreting the results of the Local Scholarship Examination that year. The percentages of boys and girls allocated by the schools to the several categories were calculated: 2%-3% were assessed as potential university scholarship winners; 31%-34% were allocated to the category of border-line cases while 2%-6% were not likely to pass any Cambridge Local Examination. The means of all quotients for the several categories were calculated and also points of demarcation between the categories. An explanation of the analysis was given for the guidance of Heads. In general, it was found that the mean performance of all the Local Scholarship candidates was equal to that of the secondary school entrants and that the means for the 1949 candidates were almost identical with those for the 1948 candidates.

Chapter 15. Reflections

190. The outstanding fact emerging from this research is the great need for more. In an article written for 'The Torch' (see Appendix 1, page 125) on the eve of leaving Jamaica, the Education Research Officer wrote: "I shall leave behind undone far more work in the realm of educational research than I realized there was to be done when first I decided where to begin." This need was apparent on all sides, in the several problems that were suggested by the research itself but which had to be set aside for lack of time, in questions that confront the Board and the Department to which only research can supply answers, in urgent pleas for assistance from inspectors, heads, those responsible for other types of education and from colonies outside of Jamaica which received scant attention from the Unit. Such appeals were the more importunate from recollections of projects which do good while they last but which do not last - a misfortune which the West Indian believes is peculiarly his. Hence the desire to have constructed as many tests as possible in the time available and the extreme precautions taken to preserve secrecy concerning them.

191. The need for research is by no means confined to the one problem so far investigated. Even in this, no more than a beginning has been made; the matter of selection demands continuous attention to the construction of tests, with which research in mental measurement and other selection methods must go hand in hand. It has been shown that the tests already constructed are deficient in some respects; further research is needed to supply these deficiencies. Selection procedures, including tests where appropriate, are required for other ages and for other purposes: for transfer at 13+ as recommended by the Kandel Commission, for technical, vocational and agricultural training, for diagnosing specific weaknesses in individual subjects, for classifying children to grades and to streams

within/

within grades quickly and accurately, to mention only a few. Individual tests are required for use in special circumstances, such as the Juvenile Court; more work on non-verbal tests is necessary for similar purposes. Research into personality problems and remedial work is urgently necessary at the "industrial" schools which also require some of the educational tests with, perhaps, some adaptations. At least one enterprising Head is endeavouring to initiate a system of adequate and accurate school records; experiment and guidance is needed here. Attitudes and circumstances leading to the serious cleavage between elementary and secondary education need to be analysed and rectified. Analysis of avenues of employment would give valuable guidance to Heads and their pupils and help prevent the evils of the "one-crop" mentality which has pervaded the field of employment, thus providing a surfeit of lawyers and pen-pushers side by side with a dearth of technicians and graduate teachers. This list could be multiplied almost indefinitely; it is enough to summarize that the field is wide open for research in education in any and all of its aspects.

192. If the need for research be great, the desire for it is greater and the will to co-operate greatest of all. The desire is not a mere wish that "somebody would do something"; the eagerness with which the research was welcomed was surpassed only by the willingness with which all from the Director downwards provided facilities and actively participated in it. The plea for extra pay for extra work was not unheard but it did not come from the Department's officers or its teachers. Nor was the extra work involved insignificant in amount; Inspectors and Heads in particular spent, in the aggregate, many days and weeks and travelled many miles, often on foot, faithfully carrying out the Research Officer's instructions, with as much emphasis on accuracy of detail as was humanly possible. The innumerable

extra/

extra hours put in by the Unit's own Staff - one of them is still devoting his spare time to it - bear witness to the same will to assist. Another factor that has materialized in recent weeks is the constructive criticism of Heads of Secondary Schools in conference. This co-operation of those who use the tests for selection and who are concerned with the subsequent education of the entrants selected by the tests is indispensable to their improvement.

193. To dwell at length on the need and desire for education does nothing in the way of finding the money to finance it. The major problem besetting education in all its aspects throughout the Caribbean is neither the lack of ideas nor the lack of will but the lack of money. The West Indian well knows from experience that no recommendations of any commission, however constructive, will be at all beneficial without the money to implement them. It may seem profitless to ask colonies which cannot afford to build sufficient schools, or even to equip properly those they have, to provide for universal elementary education, to bear the additional burden of ~~those~~ financing educational research. But, in debating the cost, the more cogent query may well be: "Can we afford not to?". With so little money available for secondary education, it is a matter of prime concern that what is available should be spent in educating those best able to profit by it. It is for Departments to decide who is to receive secondary education and of what type but such decisions of policy cannot be effective without means of selection: that is the function of research and similar arguments can be advanced to urge research into other problems.

194. It is quite certain that no one colony, with the remotely possible exceptions of Jamaica and Trinidad, could itself bear the cost of such research. To suggest a sharing of the cost by the several colonies is to presume Federation and would/

and would create a danger of dissipation of effort. Nor can it be expected that Colonial Development and Welfare Funds should continue to finance the research as these cannot be properly applied to what must be regarded as recurrent expenditure. It may also be argued that research is not primarily the function of Education Departments though their co-operation is indispensable. This contention lays the responsibility at the door of the young University College where, ideally, it truly belongs. However, the not uncommon attitude which regards this new venture as a universal and speedy remedy for most ills, educational or otherwise, may lead to unjustified disappointment. It is necessary to counter this disappointment with the warning that even universities, especially young ones, have their limitations like all human agencies. A university is no more free from the restrictions imposed by time and money than any other institution. Indeed, these restrictions have already been felt in the Institute of Social and Economic Research, where the University's research activity is at present chiefly centred. Through curtailment of grant the Institute has been obliged to curtail its research programme. This has involved the present exclusion of educational research which is being left to the Department of Education shortly to be established.

195. That much research could be done meanwhile, without special funds for the purpose and without waiting for the placing of the responsibility, is evidenced by the initiative that several departments have already taken in conducting a variety of investigations throughout the area. A summary of these may be seen in the Annual Report of the Research Council of the Caribbean Commission. Then, too, it has been mentioned in paragraphs 76, 81 and 192 that the work begun by the Research Unit is still being voluntarily carried on in such time as those interested can devote to it, though this is attended/

attended by geographical difficulties as well as those of time and expense.

196. It would not be out of place to end with the warning that the confidence of teachers and pupils must be held to ensure the success of future experiments. The Research Officer initially met much suspicion as to the motives of the research and not until these doubts were allayed was whole-hearted co-operation offered without reserve. On many subsequent occasions he was invited, in public as well as in private, to express opinions as to the relative ~~opinions~~ intelligence of (a) Jamaican and English children and (b) black, coloured and white children. Such invidious comparisons, often prompted by political rather than educational motives, have aroused much suspicion and ill-will in the past, and not in the West Indies alone. There is little to be gained and much to be lost by tactless approach to research of this kind. A fundamental principle underlay the research from the start: that educational research in the West Indies should begin with, and should be centred around, the West Indian child, not the English child or, still less, the West Indian child of any particular colour.

APPENDIX 1

PUBLISHED ARTICLES

Written for 'THE TORCH', periodical published by the Jamaica Department of Education, and appearing in the first issue of 1951.

C.D.& W. Psychological Research Scheme R 93c

EDUCATION RESEARCH UNIT

"I arrived in Jamaica on the last day of November, 1947, and within twenty-four hours had promised the Editor of "THE TORCH" to bring this research to the attention of "TORCH"-bearers by one or more contributions to this excellent periodical. That promise has not been kept until now."

With these words have begun several abortive attempts to keep that promise and the only reason I can give for not having already done so is that I have been too preoccupied with doing the work to have much time left over to talk or write about it. However, I am determined to keep my word on the eve of leaving the Colony with my work, or as much of it as has been possible, completed. An obvious advantage of this considerable delay is that it is easier to describe, not what one hopes to accomplish, but what has in fact been achieved. There is such great disparity between these two that I shall leave behind undone far more work in the realm of educational research than I realized there was to be done when first I decided where to begin.

Construction of Tests

It was first necessary to construct "the tools for the job". This task, if it is to be done properly, is laborious and tedious and a year had gone before this phase was largely complete; indeed, some of the tests are not yet finished after having been two years in the making. There were constructed group tests of two kinds: (a) tests of Intelligence or innate ability and (b) tests of school Attainment, or knowledge, in Arithmetic and English. A "group" test is one which can be administered to a large number of children at once whereas an "individual" test can not. A "battery" of such group tests is most commonly used in giving educational direction and guidance at the age 11-12 as future school success chiefly depends, in roughly equal proportions, on the degree of potential ability and the extent of knowledge already acquired (or realized ability).

Attention was concentrated on children of the 11 and 12 year groups, the age of transition from primary to post-primary schooling - a transition that is apt to be an awkward hiatus if not an unbridged chasm. (The term "post-primary" is used as it is not intended to imply only what is commonly known in Jamaica as "secondary" schooling which is only one kind of post-primary education. In effect, however, there has been very little time to attend to the requirements of any other kinds.)

Method of Test Construction

In determining what questions were suitable for Jamaican children of this age the highest possible authority was consulted, to wit, the judgement of the children themselves as revealed by their performance at several thousand specimen questions. Instead of a priori theorizing as to what Jamaican children of 11-12 could or should know or be able to do, the children themselves decided what was too easy and what was too difficult for their abilities, whether inborn or acquired. In this way, many weeks were profitably spent in more than 40 schools of all kinds in all but two or three parishes, in humble inquiry of the child himself as to what he could or could not be reasonably expected to do. This approach consumes an enormous amount of time but, I am satisfied, is the only really satisfactory one productive, in the long run, of the most beneficial results.

Aims in Test Construction/

In constructing such tests, one aims at minimizing the effect that extraneous factors may have on pupil performance, effects which, if not controlled, may act to the unfair advantage or disadvantage of many children. These factors may be summarized briefly:

(a) The type of schooling that the pupil has had previous to taking the tests. The child from the small country "Special" school should be on an equal footing with the pupil who has had an expert private tutor.

(b) The type of home environment from which the child comes. This is a most difficult factor to contend. Ideally, the child from the home where opportunities and facilities for study and development are good should be no more favourably placed, as far as the tests are concerned, than the child who may not know his own parents.

(c) The amount of concentrated coaching or cramming to which the child may have been subject for a few weeks prior to the test - a factor which may depend as much on the whim or fancy of the teacher or on the aggressiveness of the parent as on the child's ability or preference. The fleeting effect of cramming must not succeed in masquerading as real prowess.

(d) Individual differences between children within narrow or specific fields rather than in total or general ability. Each child must be given fair opportunity to excel in those questions where he best can. He must not be able to rely on the "luck of the draw" or the good fortune to get those questions in which he is most proficient or in which, perchance, he may have been most thoroughly coached.

(e) Other individual differences, e.g. emotional, temperamental, which need not detract from the pupil's educable capacity, but which may easily hinder his chances in an examination. "Examination nerves" should not be allowed to mar a good performance or rob a child of a chance he well merits.

(f) The subjective element in marking i.e. the variation of opinion from marker to marker as to what constitutes a "good" answer, a "fair" answer etc. and also the variation of the opinion of the same marker from time to time as he feels disposed to mark leniently or not.

(g) One factor, particularly relevant in Jamaica, is that of verbal facility i.e. the ability to manipulate words whether in speech, in writing, in reading or in comprehension. Because some children show a complete lack of this facility, in many instances through inadequate elementary schooling, their performance in verbal tests (tests involving words and instructions printed on paper) is either completely nil or negligible.

In varying degree all of these factors may be counteracted though perhaps none completely nullified but the last demands the construction of a special kind of test from which the printed word is absent and in which the answers require no writing.

Construction of Non-verbal Tests

The fundamental method and aims in constructing non-verbal tests are essentially the same as for verbal tests; the technical aspect is far from it. To type the letters C, O, W on paper and thus produce the desired concept in the mind of a child who reads them is a very simple matter: to produce a drawing of that domestic animal, in a space no bigger than a postage stamp, which will also, infallibly, have the same effect and then to reproduce that drawing several hundred times on paper is far from simple. But, if this be difficult, what of the task of portraying in pictures/

pictures such words as "hope", "tall", "quiet", "slowly", "because"? In the construction of these tests, produced especially for the child of inadequate school background, more than 7000 such drawings had to be executed and then reproduced in large numbers. It will not surprise the reader, therefore, to learn that the construction of these tests, begun early in 1948, is not yet quite complete. Aims of test construction, peculiar to non-verbal tests, include:

(a) The execution of drawings that will be unmistakably recognized, by every child of 11-12, for what is intended;

(b) The use of objects that will be familiar to all children. This immediately precludes, not only the use of letters and numbers, but also of such objects as blackboard, easel, tram and many other things known to the great majority but not to all children;

(c) To arouse "pure" concepts e.g. when portraying "head" or "tall", not to suggest specifically "horse's head" or "tall man" instead of the general concept of any head or the quality of being tall. There are, of course, occasions when this is quite impossible.

Having formulated the items and duplicated the drawings, there still remains the problem of explaining to the children, without giving any one a more lucid explanation and hence a bette better chance than another, exactly what they are required to do. This, too, must be done without recourse to the printed word as a medium of conveying these instructions. It is only when one attempts to achieve an object, with the sole assistance of the spoken word and pictures, that one fully realizes the part played in our lives by the printed word.

Two kinds of non-verbal questions were devised:

(a) Those in which the pictures portrayed "concrete" familiar objects such as buildings, animals, vehicles etc. and

(b) Those in which the pictures were made up of lines, circles, dots, crosses and other such "abstract" elements.

Construction of Adult Tests

At the beginning of the research in Jamaica when, with no equipment and no materials, no assistants and no office, the Unit was struggling to get on its feet, such invaluable co-operation was afforded by the Principal and Trustees of Mico College that the construction of intelligence tests for use in the Entrance Examination was willingly undertaken. Two adult tests were constructed, one verbal and one non-verbal, by the same method as outlined above except that the specimen questions were tried out in several institutions providing for adult training and education to adjudge their suitability for inclusion in the final tests. These were the first tests produced and much valuable experience was gained especially in the process of duplication. No adult tests of attainment were included in this battery.

Practical Applications

The aim from the outset was to give as much practical assistance to those responsible for the administration of education as was reasonably possible in the time available and as was consonant with the prime function of pursuing research. Moreover, such an enormous amount of ready and willing co-operation was afforded by the Education Department, by schools etc., that such practical service as it has been possible to give has been but small return for the contribution they have made to this research. ERU tests were used in the Local Scholarship Examination,

Examination in 1948 and in 1949 and, on four occasions, in the Entrance Examinations for three Training Colleges as well as one or two minor occasions for the award of scholarships or for entrance purposes. They were also used in the selection of assistants for employment at the Unit.

While the statistical analysis of results can be carried out anywhere, the field work necessary to obtain these results must necessarily be done in Jamaica. For this reason, attention has been concentrated here on the design and administration of experiments, leaving the subsequent calculations to be done on return to Edinburgh University. Consequently, only the nature, but not the findings, of experiments can be described at this time.

Local Scholarship Examination: 1948

The results of this examination are being analysed with a view to observing the following points among others:

(a) The relative numbers of pupils of different ages taking the examination. The age limits for most scholarships, 11:0 - 12:11, afford every child two chances, one at 11 and a second at 12. Are both opportunities being seized or is there a tendency in some parishes to miss one of these two opportunities?

(b) Sex differences. Do the tests favour one sex more than the other thus resulting in a disproportionate number of awards being made to girls or boys? More girls offer as candidates than boys; is this because girls are superior to boys? Is there any differential superiority of girls in one test and of boys in another?

(c) Some parishes seem to be better provided for than others both with regard to the provision of places in Secondary Schools and to the number of scholarships and free places available. Does the demand for secondary education, as evinced by the number of candidates, bear due relation to these factors?

(d) Standard in school. Are a child's chances of an award slim simply because he has not yet reached Standard 6 or do the tests detect outstanding merit irrespective of school standard attained? Does a pupil already attending a secondary school have a better chance of a scholarship, for which he is eligible, than his competitor from an elementary school?

(e) Geographical advantage. Do children born in certain parishes have less chance than others? Are a child's chances of a scholarship increased if, having been born in one parish, he goes to live and attend school in another?

Local Scholarship Examination: 1949

It is hoped, eventually, to study the results of this examination too with a view to confirming any observations arising from the analysis of the previous results.

(a) There was a considerable increase in the number of candidates in 1949. Did this simply reflect a greater number of available awards or is it indicative of greater demand?

(b) If so, was there a corresponding improvement in the calibre of the candidates?

(c) Are a child's chances better at his second attempt than at the first merely because he is older or do the age-allowances make possible a fair comparison of young with old candidates?

(d) Practice effect. Is one child more favoured than another simply because he has tried the examination before?

Scholarship Candidates Inquiry

Questionnaires were sent to every child (999 in all) who took the Local Scholarship Examination in 1948. To the moment of writing, 900 have been returned; there are still 51 missing from the Kingston and Half-way-tree Centres and 48 from the other 12 parishes. Some of the aims of this Inquiry are:

(a) How many of the children anxious for secondary schooling (as indicated by their candidacy) entered secondary schools, whether grant-aided or private, before the end of 1949?

(b) How many failed to achieve their objective and tried again in 1949? How many of these entered secondary schools in 1950?

(c) How many children, well deserving of an opportunity for secondary schooling as indicated by their test performance, fail to achieve such an opportunity? Is the best available material, most likely to benefit the Island, entering the secondary schools?

(d) Geographical differences. Are children from certain parishes more likely to enter secondary schools than others?

(e) What are those candidates, who did not enter secondary schools, doing now?

Follow-up of New Entrants to Secondary Schools: 1949

Through the ready co-operation of the Heads, a battery of ERU tests was administered to all new entrants to the 25 Grant-aided Secondary Schools at the beginning of 1949. The chief aim of this experiment is to ascertain whether the ERU tests can predict success in secondary school. This experiment cannot, therefore, be completed for four or five years until there can be some objective and universal criterion of success. Other points may include:

(a) It has been suggested that secondary schools draw their pupils chiefly from certain classes of the community. Using parental occupation as the only available guide to class, is this the case? If so, is this warranted on the grounds of superior merit?

(b) Do the new entrants drawn from different kinds of schools compare favourably with each other?

(c) Do the ERU tests select the best material for entry to secondary schools as judged by the assessments of Heads of secondary schools?

(d) What proportion does the number of available secondary school places bear to the total number of children in the Island, who, by the Secondary School Heads' Assessments, could well profit from secondary schooling?

It will be realized that there are many factors entering into a study of these points that cannot be assessed by the use of tests only.

Jamaica Educational Survey: 1949

A sample of 50 schools was chosen at random to represent the whole school population of the Island of the ages 11-12. Tests were administered to these pupils, about 2400 in all, during the last week of June, 1949, by the Inspectors of Schools. In addition, information was collected about each pupil on three kinds of questionnaires:

(a) Form H: One for each pupil filled in by the Head,
(b) Form P: One for each pupil filled in by the pupil himself,
(c) Form S: One for each School relating to every child in the school.

The questions asked covered the following ground:
On Form H (and in conjunction with Form S)

(a) School background: Number of schools attended, standard, promotion, regularity and punctuality of attendance, date of first admission to school, examinations.

(b) Home background: Whether the child lives with father or mother or both or with guardian, occupation of parent, number in family, position in family.

(c) Physical facts. Height, weight, school meals taken.

(d) Conduct. Behaviour, truancy, delinquency.

(e) Teacher's Assessment of pupil's intelligence and attainment.

On Form P.

(f) Pupil's preferences. School subjects, games, hobbies.

(g) Reading interest. Newspapers, books, use of libraries, books at home.

(h) Social activities. Church, Sunday School, Youth Clubs.

(i) Leisure interests. Radio, cinema, music, drawing, painting.

(j) Travels. To Kingston and elsewhere.

This Survey has represented an enormous amount of labour, chiefly on the part of the Heads concerned, from whom the most willing and enthusiastic co-operation has been forthcoming.

West Indies Educational Survey: 1950

As far as Jamaica was concerned, this was a repetition of the Jamaica Survey but other colonies also participated. One of the chief aims of both of these Surveys is to establish standards or "norms" of performance which will enable authorities to measure progress from year to year more objectively.

Practice-Incentive-Experience Experiment

In spite of the most careful precautions taken to produce tests that would give a "rectangular" distribution of scores (i.e. an equal number of children in each 10-point range of score from the lowest to the highest) the pupils' scores continued to show "skewness" (i.e. a disproportionately large number of scores at the lower ranges of score). This may be due to many factors, three of which were made the basis of the PIE experiment. Tests were administered to pupils within the age range 10-14 in (a) a secondary school and (b) a nearby elementary school, each representing a type of educational experience. The pupils in each school were divided into two groups and one group in each school was given intensive practice in objective tests for a week. At the end of the week a complete battery was again administered to all the pupils who were again divided into two groups, one half of each group having had the practice and the other not. One of these groups, in each school, was offered a reward for each test in which the score exceeded, by 5 points or more, the score made by the same child in the corresponding test the previous week. If symbols be used as follows: S - Secondary, E - Elementary, P - Practice, O - No practice, R - Reward, X - No reward; the grouping may be represented by these eight combinations of letters:

SPR SPX EPR EPX

SOR SOX EOR EOX

As far as possible, representation of the sexes and of years of age in these eight sub-groups was also kept uniform from one sub-group to another thus making possible further comparison between girls and boys and between children of differing ages.

Statistical analysis of the results of an experiment of this kind is rather complicated and consists of assessing the amount of improvement from the first test to the last that is attributable to each of the factors separately.

Other Investigations

The number of educational problems requiring investigation is large and a few other experiments that were planned had to be abandoned on account of the limitation of available time. One of these concerned the problem of selection for technical secondary education and it was also hoped to devote some attention to the needs of other kinds of post-primary education afforded by the Practical Training Centres and the School of Agriculture. Another plea that had to go unheeded came from the Supervisor of the Stony Hill Industrial School where a good deal of beneficial work could be done along diagnostic and remedial lines.

My chief regret is that I have been unable to be of more direct assistance to the teachers in the school who, individually and collectively, afforded the Unit an enormous amount of voluntary co-operation. Several Heads asked for tests that would assist them in grading their pupils quickly and accurately either in the proper standard or in the proper stream within a standard. Another request, often repeated, was for tests that would diagnose specific weaknesses within subjects. Unfortunately, existing ERU tests are not readily adaptable to these purposes and time did not permit of the construction of tests to satisfy these urgent needs.

Valuable help was readily afforded from so many sources within the sphere of Education that it would be invidious to specify any. Suffice it to say that if the interest shown and the assistance rendered be any indication of a progressive outlook in education, then the prospects for the future in Jamaica are very gratifying. Considerable assistance was also given by several departments not directly concerned with Education. The readiness of these to help is indicative of the degree to which Jamaica is "education-conscious".

Finally, but foremost, appreciation must be expressed to thousands of Jamaican boys and girls without whose efforts in working the tests the most well-meaning assistance of all others would have been of no avail.

Education Research Unit,
Mandeville,
Jamaica.

22nd March, 1950.

NOTE ON A 'NEW' NON-VERBAL INTELLIGENCE TEST ITEM

British Journal of Psychology (General Section) April(?)1951

Neither the original typescript nor the off-print is available at time of writing. The only copy available is the galley-proof which comprises the next two pages (133-4).

L 70 Gen Psych

Spare copy for author's retention

NOTE ON A 'NEW' NON-VERBAL INTELLIGENCE TEST ITEM

By A. DEANS PEGGS (*Colonial Education Service*)

I. Description of the item

In the realm of intelligence test items there can now surely be nothing new under the sun. The item described here is 'new' only in so far as it has not been seen by the writer in any non-verbal test, British, Canadian, American or Australian, and was devised spontaneously in the course of research at the Education Research Unit[1], Jamaica. The purpose of this note is to describe it to others who may wish to experiment with it.

'Homonyms' is a convenient name as the aim in solving the item is to pick out two pictures, from several, which portray either

(*a*) different meanings of the same word, or

(*b*) different words having the same pronunciation.

The words portrayed may be nouns or verbs. Other parts of speech do not lend themselves

[1] A temporary Unit pursuing research under Colonial Development and Welfare Psychological Research Colonial Scheme R 93*c* under the auspices of the Social Science Research Council during 1947–50.

well to use in this item though adjectives have been tried. Verb tenses other than the present are difficult.

The execution of a drawing which will be recognizable for what it is intended to portray presents great difficulty as in most non-verbal items. This applies especially to verbs and adjectives but also to nouns where only a part of a whole object is implied. Thus, when portraying the brake of a bicycle, it is necessary to compromise between drawing enough of the bicycle to identify the brake and drawing so much of the bicycle as to detract attention from the part to the whole. It is quite impossible to use many homonyms because of the difficulty of portraying the words involved, e.g. 'weight' and 'wait'.

The following examples are given:

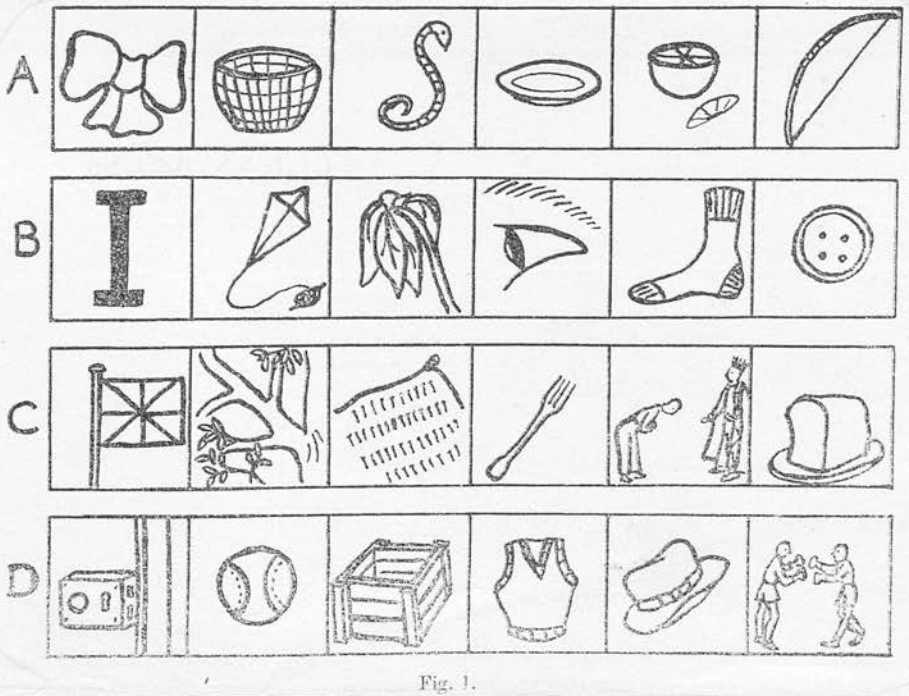


Fig. 1.

II. Results obtained in Jamaican experiments

264 Jamaican pupils, aged 11, in secondary and elementary schools were allowed to try 28 of these items. In the instructions given orally, four examples were fully explained and were followed by six practice items. For each item a facility (or difficulty) value, F, and an efficiency (or item-validity) value, E_{13}, were calculated. F is simply the percentage of children 'passing' the item while E_{13} is the difference between the proportions passing in the top and bottom thirds. The children were allocated to thirds on the basis of total score in this and fifteen other types of non-verbal items numbering, in all, 600.

The two items A and B illustrated above, each involving two nouns, had facility values 55 and 61 respectively with efficiency values of 0·69 and 0·75. The items, C and D, each introducing a verb, were more difficult ($F = 19$ and 27 respectively) but one of them (D) had a fairly high efficiency value of 0·65 whereas C had an efficiency value of only 0·31. In general, the items were much too difficult for the children concerned, only four of them being answered correctly by more than 50% of the pupils. Correspondingly, E_{13} exceeded 0·50 in only seven instances. The fact that, in all items, the percentage of success increased uniformly from the bottom to the top third where, in most cases, it was fairly high suggests that the item may be more suitable with other groups such as secondary school pupils only or unselected children of greater age (in Jamaica).

To assess the extent of possible ambiguity, the pupils were required to write the homonymous words in addition to merely indicating the correct alternatives. This revealed a clear distinction between right and wrong responses as there was virtually no evidence of justification of wrong responses. One notable exception, involving 'crown' (as worn by a monarch) and 'crown' (of a hat), produced 16% of responses 'hat—hat'. To insist that this response is not a homonym would be pedantic.

In a further experiment a total of 51 such items, together with 1153 other non-verbal items in 18 tests and a battery of verbal tests of intelligence and attainment, were administered to 522 pupils. Analysis of these results gives the following information about the homonyms:

(*a*) There is no significant sex difference.

(*b*) Product-moment correlations with nine other non-verbal tests involving 'concrete' objects (animals, vehicles, buildings, etc.) varied within the narrow range 0·62–0·71.

(*c*) With nine non-verbal tests involving 'abstract' elements (lines, dots, squares, crosses, etc.) the correlations were 0·55–0·67.

(*d*) With total score in all non-verbal tests the correlation was 0·82.

(*e*) With score in two verbal intelligence tests of 100 and 50 items respectively the correlations were 0·81 and 0·76.

(*f*) With score in two attainment tests in English and Arithmetic of 120 and 100 items respectively the correlations were 0·81 and 0·73.

(*g*) With total score in the four tests of the verbal battery (including arithmetic) the correlation was 0·82.

A factor analysis of the results of this experiment is being carried out.

(*Manuscript received* 4 *August* 1950)

ANALYSIS OF VARIANCE OF NON-ORTHOGONAL DATA

British Journal of Psychology (Statistical Section) June 1951

In the summers of 1939 and 1940, an American worker conducted intelligence tests in Jamaica and a dependency. The aim of the experiments, in part, was to investigate the effects of race and socio-economic status on test performance. Following completion of the field-work, the statistical analysis was held up through illness of the worker. The work was brought to the attention of Professor I.L.Kandel, of Columbia University, while he was conducting the Commission of Inquiry into Secondary Education, and he referred it to Professor Sir Godfrey Thomson, of Moray House, Edinburgh University, to whom the results were subsequently sent. Sir Godfrey referred them for attention to the present writer.

The data, being non-orthogonal, required the application of a somewhat obscure method of analysis of variance, due to Dr. F. Yates. The following article was written in illustration of this method as applied to educational research. It may, perhaps, serve a more useful purpose by illustrating what can be avoided by careful design of an experiment although, in the present instance, the non-orthogonality could not easily have been avoided altogether.

Article appearing in British Journal of Psychology (Statistical Section), Vol. IV, 1951

ANALYSIS OF VARIANCE OF NON-ORTHOGONAL DATA

By A. DEANS PEGGS,
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I. Problem and Data. II. Analysis of the Data. III. Advantages and Dangers. IV. Regression on Age. V. Separate Analyses of Six Tests. VI. Summary.

I. PROBLEM AND DATA

This article describes the application of the method of analysis of variance to a special case of unequal cell numbers; and is presented as an illustrative example of the use of this method in educational research.

The source of the data is immaterial; and, in deference to the wishes of the worker concerned, need not be mentioned. The aim of the experiment was to investigate the effects of racial group and social status on test performance but the aim of this article is simply to illustrate the method used. The experiment was part of a much larger research; but only a part is reported here as the numbers involved are not so large as to obscure the essentials of the method which it is intended to exemplify. The group tests used with this sample were:

1. Goodenough Man Test, in which the child is instructed simply to draw a man, points being awarded for the amount of detail given;

2. Purse Test, as seen in Form L of the Terman-Merrill revision of the Binet Test at age XIII but scored on a ten-point scale;

3. Squares Test, similar to Koh's Blocks but modified for use as a paper-and-pencil group test;

4. Blocks Test, in which the subject must estimate the number of blocks in an illustration;

5. Forms Test, in which a square must be dissected by pencil lines in such a way as to yield parts of given shape and size and

6. Pictorial Classification, in which the dissimilar figure in a series of drawings is to be crossed out.

The data/

The data, with which we are here concerned, include, besides the scores obtained, observations concerning:

1. Age;
2. Social status of parents rated, on the basis of parental occupation and other secondary considerations, in three grades: High, Middle, Low;
3. Race, classified, on the basis of skin colour with other secondary considerations, in three groups: Black, Brown, White.

Table I summarizes the information concerning number of children, age, score, parental occupation (or social status), and colour (or race).

TABLE I. NUMBERS OF CHILDREN, TOTAL SCORES AND AGES.

PARENTAL OCCUPATION		COLOUR: Black	Brown	White	Total
High	n	5	7	17	29
	Σx	197.5	252.0	714.0	1163.5
	Σa	106	123	254	483
Middle	n	10	20	8	38
	Σx	308.5	741.0	272.0	1321.5
	Σa	172	389	170	731
Low	n	34	31	27	92
	Σx	1064.0	1057.5	964.5	3086.0
	Σa	636	544	475	1655
Total	n	49	58	52	159
	Σx	1570.0	2050.5	1950.5	5571.0
	Σa	914	1056	899	2869

Double line — not treble.

$\Sigma x^2 = 216,842$

$\Sigma a^2 = 67,063$

$\Sigma ax = 107,525$

} summed over 159 children

n = number of children in each sub-class;
x = the sum of one child's unweighted scores in all six tests;
a = age in months measured from 7 years 6 months as zero.

II. ANALYSIS OF THE DATA

It will be seen that the numbers of children in the nine sub-classes are neither equal nor proportional. This means that a comparison/

Note for Printer: The written characters in 2nd column of Table I and below are all the Greek capital letter sigma (Σ)

comparison of the score totals for the three occupations, taken as they stand, will be markedly biased by differences of score among the colours, if any such differences do in fact exist, and vice versa: that is to say, the data are non-orthogonal. Similarly, the distribution of age is not the same for different occupations and different colours.

Snedecor (2) has shown, by observation of several hundred cases, that his 'Method of Expected Numbers' may be used with such disproportionate data when the departure of the sub-class numbers from proportionality is no greater than could be ascribed to chance sampling. To test the significance of such departure from proportionality he uses chi-squared. In the present instance, χ^2 is 15.08 and with 4 degrees of freedom this corresponds to a value of P between 0.01 and 0.001. This discrepancy is sufficiently obvious to make a formal test needless.

The method here adopted is that applied by Yates (3,4) to similar non-orthogonal data from experiments in live-stock and agriculture. It will involve fitting constants representing the main effects of occupation and colour. It is most convenient to use five constants, namely,

γ representing the hypothetical mean score of black children in the low occupation category,

α_1, α_2 being increments of score, added to this basic mean, due to the effects of { Brown colour, White colour }

β_1, β_2 being increments of score, added to this basic mean, due to the effects of { Middle Occupation, High occupation. }

Table I may now be modified to show, not the observed total score in each sub-class, but the hypothetical sub-class mean and the marginal or class totals to which they must be made to conform as nearly as possible. Age is omitted for the moment.

TABLE II/

TABLE II. HYPOTHETICAL SUB-CLASS MEANS.

PARENTAL OCCUPATION			COLOUR: Black	Brown	White		Total
	High	$\bar{x}$	$\gamma + \beta_2$	$\gamma + \alpha_1 + \beta_2$	$\gamma + \alpha_2 + \beta_2$	Σx	1163.5
	Middle	$\bar{x}$	$\gamma + \beta_1$	$\gamma + \alpha_1 + \beta_1$	$\gamma + \alpha_2 + \beta_1$	Σx	1321.5
	Low	$\bar{x}$	γ	$\gamma + \alpha_1$	$\gamma + \alpha_2$	Σx	3086.0
	Total	Σx	1570.0	2050.5	1950.5	Σx	5571.0

$\bar{x}$ = hypothetical sub-class mean.

This hypothesis assumes that the effects of parental occupation and colour upon a child's score are additive. Departures from this additive laws are termed interactions, and it will be found necessary, before carrying out the analysis of variance with respect to the effects of colour and occupation, to test the assumption that such interactions are non-existent or negligible, i.e. whether the hypothesis that the effects of occupation and colour upon a child's score are simply additive or whether they follow some more complex law.

It is first necessary to estimate the five constants. This is accomplished by the method of least squares which consists of minimizing the quantity

$$\Sigma n \left[(\text{observed mean} - \text{hypothetical mean})^2 \right]$$

where n is the number of children in any one sub-class and the summation is over the nine sub-classes. This gives five equations in the five unknowns. Without entering into the mathematics involved, these equations may be simply obtained from Table II and the sub-class frequencies of Table I. Thus,

the/

the equation (1) for α_1 is obtained from the "brown" column by equating the total hypothetical score to the observed total:

$$7(\gamma+\alpha_1+\beta_2)+20(\gamma+\alpha_1+\beta_1)+31(\gamma+\alpha_1)=2050.5.$$

The equations (2), (3) and (4) for α_2, β_1 and β_2 are similarly derived from the " white" column and the " middle" and "high" rows respectively. The fifth equation, for γ, may be obtained from the marginal, or class, totals and the grand total.

$$58\alpha_1 + 20\beta_1 + 7\beta_2 + 58\gamma = 2050.5 \quad \ldots\ldots(1)$$

$$52\alpha_2 + 8\beta_1 + 17\beta_2 + 52\gamma = 1950.5 \quad \ldots\ldots(2)$$

$$20\alpha_1 + 8\alpha_2 + 38\beta_1 + 38\gamma = 1321.5 \quad \ldots\ldots(3)$$

$$7\alpha_1 + 17\alpha_2 + 29\beta_2 + 29\gamma = 1163.5 \quad \ldots\ldots(4)$$

$$58\alpha_1 + 52\alpha_2 + 38\beta_1 + 29\beta_2 + 159\gamma = 5571.0 \quad \ldots\ldots(5)$$

Resorting to matrix algebra and writing these equations in the form $A\lambda = S$, λ can be determined from the equation $\lambda = A^{-1}S$, if the reciprocal matrix A^{-1} be first calculated. An approximation to the reciprocal matrix was first obtained by pivotal condensation and then corrected to eight decimal places by the iterative method described by Hotelling (1); but only four decimal places are given here:

$$A^{-1} = \begin{bmatrix} 0.0385 & 0.0207 & -0.0056 & -0.0024 & -0.0190 \\ 0.0207 & 0.0419 & -0.0004 & -0.0103 & -0.0193 \\ -0.0056 & -0.0004 & 0.0382 & 0.0105 & -0.0089 \\ -0.0024 & -0.0103 & 0.0105 & 0.0481 & -0.0070 \\ -0.0190 & -0.0193 & -0.0089 & -0.0070 & 0.0229 \end{bmatrix}$$

This leads to the following estimates for the vector λ :

$$\lambda = \{\underset{3.0663}{\alpha_1}, \underset{4.2543}{\alpha_2}, \underset{1.0051}{\beta_1}, \underset{5.6249}{\beta_2}, \underset{31.2617}{\gamma}\}$$

It is now possible to repeat Table II, substituting these values for the five constants, and, multiplying by the hypothetical sub-class means thus obtained by the number of children in each case, to obtain the hypothetical total score for each sub-class. These are given in Table III. That the hypothetical sub-class totals should sum to the observed class totals provides a check at this stage.

TABLE III. ESTIMATED HYPOTHETICAL SUB-CLASS MEANS

PARENTAL OCCUPATION		COLOUR: Black	Brown	White	Total
High	$\bar{x}$	36.8866	39.9529	41.1409	
	Σx	184.4330	279.6703	699.3953	1163.4986
Middle	$\bar{x}$	32.2668	35.3331	36.5211	
	Σx	322.6680	706.6620	292.1688	1321.4988
Low	$\bar{x}$	31.2617	34.3280	35.5160	
	Σx	1062.8978	1064.1680	958.9320	3085.9978
Total	Σx	1569.9988	2050.5003	1950.4961	5570.9952

The significance of the interaction may now be tested. It is necessary to calculate the sum of squares between the nine sub-classes both from the observed data of Table I and from the hypothetical values of Table III. These are 1711 and 1422 respectively. The sum of squares for interaction is the difference between these two estimates, i.e. 289.

In practice it is not necessary to construct Table III, as the sum of squares, 1422, may be derived more conveniently by/

by forming the inner product of the constants (λ) and the marginal totals (S), from which the correction for the mean, 195195, may then be subtracted. The total sum of squares, calculated from 159 individual observed scores and corrected for the mean, is 21647. Table IV shows the test for the significance of the interaction.

TABLE IV. TEST OF SIGNIFICANCE OF INTERACTION AND OF COMBINED MAIN EFFECTS

Category	Degrees of freedom	Sum of squares	Mean Square	Variance ratio	Significance
Colour and occupation	4	1422	356	2.68	S
Interaction (C × O)	4	289	72	0.54	NS
Between sub-classes	8	1711			
Within sub-classes	150	19936	132.91		
Total	158	21647			

S = Significant at 5% level; NS = Not significant at 5% level.

It is clearly evident that there is no evidence of significant interaction, i.e. we may legitimately assume that the effects of colour and occupation are additive. This being so we can proceed to test the significance of the main effects. In doing so it is permissible to combine the degrees of freedom and sum of squares for interaction with those for 'within sub-classes' or so-called 'error'. This would give a mean square 131.33 which would enhance the value of the variance ratio, F, in the subsequent tests. Since this procedure would make no considerable difference in the present case it has not been carried out.

The test of the significance of the effect of colour and occupation together is shown in Table IV, and gives a variance ratio of 2.68. The corresponding 5% point is 2.43 and therefore the combined effect of colour and occupation may be adjudged significant at that level.

To test/

To test the significance of occupation it is necessary to obtain an estimate of the variance due to this effect which is completely free from the influence of colour. On account of the non-orthogonality of the data, the quantity

$$\frac{(1163.5)^2}{29} + \frac{(1321.5)^2}{38} + \frac{(3086.0)^2}{92} - \frac{(5571.0)^2}{159} = 957,$$

~~formed from the row totals of Table I,~~ which would in ~~other circumstances~~ ordinarily be used to test the significance of occupation, is here partly due to the effect of colour. This difficulty is overcome by subtracting from 1422 (the sum of squares due to the combined effect of colour and occupation) the quantity

$$\frac{(1570.0)^2}{49} + \frac{(2050.5)^2}{58} + \frac{(1950.5)^2}{52} - \frac{(5571.0)^2}{159} = 764,$$

~~formed from the column totals of Table I,~~ which includes all the effect of colour as well as some of that due to occupation. The resulting estimate, 658, may not, and most probably does not, represent the total effect of occupation, but it is ~~nevertheless~~ due to nothing else but occupation. A similar procedure is adopted to obtain an unbiased estimate for variance due to colour free from any effect of occupation. The variance due to these two effects is compared with 132.91 to decide their respective significance.

TABLE V./

TABLE V. TEST OF SIGNIFICANCE OF MAIN EFFECTS

Category	Degrees of freedom	Sum of squares	Mean square	Variance ratio	Significance
Colour and occupation	4	1422			
* Colour, neglecting occupation	2	764			
Remainder (Occupation)	2	658	329	2.48	NS
Colour and occupation	4	1422			
Occupation, neglecting colour	2	957			
Remainder (Colour)	2	465	233	1.75	NS

NS = Not significant at 5% level

The 5% point of F for 2 and 150 degrees of freedom is 3.06; and therefore this analysis shows that the effects of occupation and colour, considered separately, do not attain significance. That either colour, occupation or both are producing a significant effect is shown by the previous analysis: more extensive data would be required to assess at all accurately the relative magnitude of the effects of the two factors.

III. ADVANTAGES AND DANGERS

One of the main advantages of the method of analysis of variance in educational research is that it is possible to allow more than one factor to vary simultaneously and still be able to apportion the resulting effects to the several causes. Such an experiment has no need of a separate and distinct control group; it can therefore be carried out under conditions which approach the children's ordinary activities more nearly than the artificial and rigidly controlled conditions of other procedures which demand a fair/

* i.e. Colour, neglecting the possibility of this estimate containing any occupation effects.

a fair measure of selection of subjects. This does not free the observer from the responsibility of designing the experiment beforehand. Otherwise, the subsequent calculations may be extremely laborious and only partial accuracy achieved in the end.

There is the further danger that results obtained may be due to some factor(s) other than those investigated. For instance, the conclusions reached above, in the present study, may be invalidated by some other variable factor such as sex, school or age. Observations on these three variables were made in the investigation and they were also considered in the analysis. But it is not outside the bounds of possibility that some other factor not considered - even perhaps unknown - may have given rise to, or obscured, the results attributed to other causes. In any conclusion which may be drawn, an opening must always be allowed for some other possible explanation of the observed phenomena.

The influence of sex and school on a child's score was found to be not significant but, not surprisingly, the effect of age was very significant. Again, because of the non-orthogonality of the data (i.e. disproportion in the numbers of children of various ages in the several sub-classes) the effect of age tended to obscure the effects of colour and occupation. In what follows, the effect of age will be examined separately; then, by co-variance methods, the variance due to age will be removed to allow a consideration of the effects of colour and occupation unobscured by the influence of age.

IV. REGRESSION ON AGE

To test the significance of the regression of score on age it is necessary to know the 'within classes' or 'error' sum of squares of age/

squares of age and corresponding sum of cross-products of age and score. These are obtained by first calculating the total sum of squares (and cross products) summed over 159 cases. They were given in Table I as 67,063 and 107,525 respectively, age in each case being reckoned in months above 7 years 6 months. From these is obtained the estimate, $\frac{(7315)^2}{14923} = 3586$, of that part of the error sum of squares of score which is due to the regression of score on age, assuming this to be linear. The analysis appears in Table VI.

TABLE VI. TEST OF SIGNIFICANCE OF REGRESSION OF SCORE ON AGE

Category	Degrees of freedom	Sum of squares	Mean square	Variance ratio	Significance
Linear regression	1	3586	3586	32.68	SSS
Remainder	149	16350	109.73		
Within sub-classes	150	19936			

SSS = Significant at 0.1% level.

That the regression of score on age is highly significant was to be expected. It indicates, however, that the influence of removing the effect of age by co-variance methods will be to increase the precision of the tests of the other main effects. It will be observed that the error mean square has been reduced from 132.91 to 109.73.

Constants must be fitted for age in the same way as for score from the equation

$$\lambda' = A^{-1}S'$$

mbda.

A^{-1} being the reciprocal matrix as before and S' being obtained from the marginal totals for age in Table I:

$$S' = \{1056,\ 899,\ 731,\ 483,\ 2869\}$$

whence

$$\lambda' = \{-0.6054,\ -1.0572,\ 1.2746,\ -1.0824,\ 18.5034\}.$$

From these values Table VII may be compiled, similar to Table III, showing the hypothetical sub-class mean ages on the assumption of negligible interaction. That the hypothetical sub-class ~~mean-ages~~ totals should sum to the observed class totals provides a check similar to that of Table III.

TABLE VII./

TABLE VII. HYPOTHETICAL SUB-CLASS MEAN AND TOTAL AGES

PARENTAL OCCUPATION		C O L O U R			
		Black	Brown	White	Total
High	$\bar{a}$	17.4210	16.8156	16.3638	
	Σa	87.1050	117.7092	278.1846	482.9988
Middle	$\bar{a}$	19.7780	19.1726	18.7208	
	Σa	197.7800	383.4520	149.7664	730.9984
Low	$\bar{a}$	18.5034	17.8980	17.4462	
	Σa	629.1156	554.8380	471.0474	1655.0010
Total	Σa	914.0006	1055.9992	898.9984	2868.9982

From this table, the hypothetical sum of squares of age between sub-classes is found to be 137; but this may be derived more conveniently, without the need for compiling Table VII, from the inner product of λ' and S'. The corresponding sum of cross-products (-319) may be obtained from the figures of Tables III and VII or, more conveniently, from the inner product of either λ and S' or λ' and S.

The remaining sums of squares of age and sums of cross-products needed for removing the effect of age are obtained from Table I in a manner similar to that employed for computing the corresponding sums of squares of score. It is convenient to tabulate them as in Table VIII which also shows the calculations necessary to arrive at the adjusted sums of squares used in the final analysis. It will be observed that the first four ~~quantities~~ ~~(1~~ rows are not corrected for the mean; this is accomplished incidentally in the subtractions at (A) to (D). Accordingly, the degrees of freedom shown at (a) to (d) are, in each instance, one greater than would otherwise be the case.

The quantities in columns (2) to (4) at (A) to (D) correspond to those at (i) to (iv) but include the error sum of squares or cross-products (f). The sums of squares of scores at (A) to (D) in column (4) are adjusted by subtracting from each/

each the quantity $\frac{(\text{sum of cross-products})^2}{\text{sum of squares of age}}$. From the corresponding remainders in column (6) is subtracted the adjusted error sum of squares, 16350. These final adjusted sums of squares for use in the final analysis of variance are the last four entries in column (6). It will be seen that, in practice, Table VIII contains all the information necessary for the analyses made in Tables IV, V, VI and IX.

TABLE VIII. COMPLETE TABLE OF SUMS OF SQUARES AND CROSS-PRODUCTS OF SCORE AND AGE

	Category	1 d.f.	2 Σa^2	3 Σax	4 Σx^2	5 $\frac{(\Sigma ax)^2}{\Sigma a^2}$	6 (4)-(5)	7 d.f.
(a)	Sub-classes and Mean	9	52140	100210	196906			
(b)	Colour, Occupation and Mean	5	51905	100204	196617			
(c)	Colour and Mean (neglecting occupation)	3	51818	100340	195959			
(d)	Occupation and Mean (neglecting colour)	3	51879	100314	196152			
(e)	Mean	1	51768	100523	195195			
(f)	Within classes (error)	150	14923	7315	19936	3586	16350	149
(A)	(a) - (b) + (f)	154	15158	7321	20225	3536	16689	153
(B)	(b) - (e) + (f)	154	15060	6996	21358	3250	18108	153
(C)	(b) - (d) + (f)	152	14949	7205	20401	3473	16928	151
(D)	(b) - (c) + (f)	152	15010	7179	20594	3434	17160	151
(i)	(a)-(b) Interaction	4	235	6	289	(A)-(f)	339	4
(ii)	(b)-(e) Colour and occupation	4	137	-319	1422	(B)-(f)	1758	4
(iii)	(b)-(d) Colour	2	26	-110	465	(C)-(f)	578	2
(iv)	(b)-(c) Occupation	2	87	-136	658	(D)-(f)	810	2

The mean squares ~~variances~~ corresponding to these reduced sums of squares are now tested for significance against the reduced error mean square, ~~variance~~, 109.73. This is shown in Table IX in which it is seen that the effect of colour and occupation together, formerly significant at 5%, is now significant at 1%; while occupation, tested separately, may now be adjudged significant/

significant at the 5% level. There is still no justification for attributing to colour any significant influence on a child's score.

TABLE IX. FINAL TEST OF SIGNIFICANCE (EFFECT OF AGE REMOVED)

Category	Degrees of freedom	Sum of squares	Mean square	Variance ratio	Significance
Interaction (C × O)	4	339	85	0.77	NS
Colour and occupation	4	1758	440	4.01	SS
Colour	2	578	289	2.63	NS
Occupation	2	810	405	3.69	S
Error	149	16350	109.73		

NS = Not significant at 5%; S = Significant at 5%;
SS = Significant at 1%.

V. SEPARATE ANALYSES OF SIX TESTS

A footnote to Table I explained that the scores analysed were the simple sums of children's unweighted scores in each of the six tests. Since the standard deviations of the scores showed considerable variation, the contribution of some of the tests to the results just arrived at was much greater than others with a very low standard deviation. The relative influence of the six tests upon the analyses carried out above is indicated by the following table:

TABLE X. STANDARD DEVIATIONS OF SCORES

No.	Test	Standard deviation
1	Goodenough Man	5.9
2	Purse	2.7
3	Squares	1.8
4	Blocks	3.0
5	Forms	1.2
6	Classification	2.8
	Summed scores	11.7

This shows that a simple summation of scores gives the Man/

the Man Test twice as much, or more, weight as any of the other five while the Squares and Forms Tests are virtually swamped by the others. Since there were no a priori grounds for weighting the six tests in any specific ratio, the procedure outlined was applied to each of the tests separately. In no instance was there found to be significant interaction. The results of the tests of significance, after removing the effect of age, are summarized in Table XI.

TABLE XI. SIGNIFICANCE OF MAIN EFFECTS AS REVEALED BY INDIVIDUAL TESTS

Category	1 Man	2 Purse	3 Squares	4 Blocks	5 Forms	6 Classification
Regression of score on age	SSS	SS	SSS	SSS	SS	S
Colour and occupation	NS	NS	S	SS	SSS	SSS
Colour	NS	NS	NS	NS	SSS	SSS
Occupation	NS	NS	S	S	SSS	SSS

NS = Not significant at 5%;
S, SS and SSS = Significant at 5%, 1% and 0.1% respectively

VI. SUMMARY

1. The numbers of pupils involved in a two-way classification were found to be disproportionate or non-orthogonal.

2. The chi-squared test showed that the departures from orthogonality could not reasonably be ascribed to chance. Therefore, Snedecor's 'Method of Expected Numbers' was not applicable.

3. Yates' method was adopted of fitting constants for the main effects and the mean. These constants were estimated by the method of least squares.

4. The interaction between the main effects was tested and found to be not significant, i.e. their effect upon scores may be presumed to be additive.

5./

5. An analysis of variance was then performed and it is shown how an unbiased estimate of the variance due to each of the main effects may be obtained.

6. The regression of score on age was tested and found significant.

7. By co-variance methods, involving fitting a further constant for age, the effect of age was removed from the variance and the significance of the main effects again tested and found to be enhanced.

8. This process, having been performed on summed scores, was repeated for each test separately; the significance of the main effects varied considerably from test to test.

The writer is greatly indebted to Dr. D.N. Lawley for advice and guidance.

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APPENDIX 2

Schools etc. where Drafts of Tests were Administered

TABLE 31 SCHOOLS IN WHICH VERBAL DRAFTS WERE ADMINISTERED WITH NUMBERS OF PUPILS (11+ DRAFTS)

Parish and Inspectors	School	Kind of School	Head	Number of Pupils who worked Drafts A	B	C	D
Chiefly Kingston and St.Andrew; otherwise any	Jamaica College	Boys' Secondary	H.C.Chambers, B.Sc.	22	27		
	St.Andrew High School	Girls' Secondary	Miss M.F.Gartshore, M.A.	25	25		
	St.Hugh's High School	Girls' Secondary	Mrs.R.Landale, M.A.			28	29
	Kingston College	Boys' Secondary	Rt.Rev.P.W.Gibson,B.A.,B.D.			19	20
Kingston J.A.Woodstock	Kingston Senior School	Mixed Senior	E.H.Cousins	56	56		
St.Andrew E.B.Johnson	Half Way Tree	Elementary	S.W.James			77	83
	Mount James	Elementary	Miss I.C.Nicholson	23	27		
St.Mary R.E.Morris	Belfield	Elementary	M.A.Rennalls	26	27		
	Goshen	Elementary	F.H.Jones			26	20
	Highgate	Elementary	R.S.Brooks	44	40		
	Preston	Elementary	E.F.Lawes	28	18		
	Zion Hill	Elementary	J.H.Parke			21	21
St.Ann S.E.Buck	Brown's Town	Elementary	C.E.Atkinson			78	47
4 parishes	13 schools			224	220	249	220

TABLE 32 SCHOOLS IN WHICH NON-VERBAL DRAFTS WERE ADMINISTERED WITH NUMBERS OF PUPILS (11+ DRAFTS)

Parish and Inspector	School	Kind of School	Head	Number of Pupils who worked Drafts 1	2
Chiefly St.James and Manchester; otherwise any	Cornwall College (a)	Boys' Secondary	N.S.Jackson, B.A.	11	10
	Manchester School (b)	Mixed Secondary	J.C.Sleggs, B.Sc.	22	
	Munro College (c)	Boys' Secondary	B.B.Ward, M.A.		27
	Hampton School (c)	Girls' Secondary	Miss D. Parsons, B.A.		4
	Montego Bay High (a)	Girls' Secondary	Mrs.J.M.Morrison, M.A.	6	7
	de Cartaret School (b)	Boys' Preparatory	Rev.-.-.Morton-Yorke	10	
Manchester G.K.Roberts	Bryce (d)	Elementary	A.A.Morgan	22	18
	Christiana Church (d)	Elementary	E.D.Limonius	19	20
	Christiana Moravian (d)	Elementary	H.E.Gayle	12	14
	Mandeville (e)	Elementary	R.A.Gordon	15	14
	New Green (e)	Elementary	E.L.Stephenson	15	17
	Willaimsfield (e)	Elementary	H.L.Johnson	14	13
St. James V.C.Cuthbert, B.A.	Cambridge (f)	Elementary	J.W.Kentish	27	32
	Catadupa (f)	Elementary	C.A.Wright	15	15
	Mount Horeb (f)	Elementary	L.R.Pape	12	8
Hanover V.C.Cuthbert	Senior (f)	Elementary	L.A.McIntosh	4	2
Westmoreland J.N.Jones,B.A.	Petersfield (g)	Elementary	W.E.Dunn	22	14
	Savanna-la-mar (g)	Elementary	D.O.Haase	38	45
4 parishes	18 schools			264	260

Note: Through the co-operation of the Heads and, in most instances, the Director of Public Works, it was possible to cope with the 18 schools at 7 centres only; these are indicated by the letters (a) to (g) following the name of each school. Considerable saving of time was also effected in this way.

All elementary schools are mixed.

TABLE 33 SCHOOLS ETC. IN WHICH ADULT DRAFTS (VERBAL AND NON-VERBAL) WERE ADMINISTERED WITH NUMBERS OF STUDENTS

Parish	Institution	Kind	Head	Number of Students Male	Female
Kingston	Wolmer's Boys' School	Boys' Secondary	J.R.Bunting, M.A.	30	
Kingston	Wolmer's Girls' School	Girls' Secondary	Mrs.E.C.Skempton, B.A.		22
Kingston	Kingston Technical S.	Technical School	R.S.Anderton, B.Sc.	36	30
St. Andrew	Mico Training College	Men's T.C.	A.J.Newman, M.C.,M.A.	28	
St. Andrew	Shortwood Training C.	Women's T.C.	Miss A. Roberts, M.A.,M.Sc.		23
St. Mary	Dinthill Practical Training Centre	Boys' Vocational		36	
St. Catherine	Carron Hall Practical Training Centre	Girls' Vocational	Miss Foster-Davis		33
				130	108

APPENDIX 3

TIMING OF 11+ VERBAL DRAFTS

TABLE 34. TIMING OF THE DRAFTS OF THE 11+ TESTS

A. Time taken by percentages of pupils to complete Drafts D

Intelligence				English			
Time (mins)	Rural elem.	Urban elem.	Girls sec.	Time (mins)	Rural elem.	Urban elem.	Girls sec.
30	0	1	-	30	-	3	41
31-45	5	23	55	31-45	3	26	52
46-60	5	48	35	46-60	11	47	7
61-75	3	15	10	61-75	14	12	-
76-90	26	6	-	76-90	26	10	-
91-105	23	6	-	91-105	6	1	-
106-120	10	1	-	106-120	29	1	-
120	28	-	-	120	11	-	-
Arithmetic, Section I (Mechanical)				Arithmetic, Section II (Problem)			
20	-	5	42	20	-	-	17
21-30	9	48	28	21-30	7	32	28
31-40	13	14	27	31-40	3	16	45
41-50	13	32	3	41-50	28	52	10
51-60	23	1	-	51-60	14	-	-
61-70	13	-	-	61-70	24	-	-
71-80	23	-	-	71-80	17	-	-
80	6	-	-	80	7	-	-

B. Percentage of total items attempted by percentages of pupils in 60 minutes (30 minutes each Section of Arithmetic)

Intelligence				English			
%age items	Rural elem.	Urban elem.	Girls sec.	%age items	Rural elem.	Urban elem.	Girls sec.
100	10	72	90	100	14	76	100
80-99	15	16	10	80-99	14	11	-
60-79	24	9	-	60-79	28	8	-
40-59	7	2	-	40-59	33	5	-
20-39	24	1	-	20-39	8	-	-
0-19	20	-	-	0-19	3	-	-
Arithmetic, Section I (Mechanical)				Arithmetic, Section II (Problem)			
100	9	53	70	100	7	32	45
80-99	11	17	27	80-99	21	16	?
60-79	25	22	3	60-79	11	19	?
40-59	30	8	-	40-59	18	27	?
20-39	18	-	-	20-39	27	5	?
0-19	7	-	-	0-19	16	1	?

Explanation

------- Time limit tests Batteries 2 and 3
——————— Time limit tests Battery 1
? Not properly recorded
Rural elem: 2 rural elementary schools (N = 47)
Urban elem: 1 urban elementary school (N = 80)
Girls sec.: 1 girls' secondary school (N = 28)

APPENDIX 4

COMPOSITION OF 'ERU' TESTS

TABLE 35. COMPOSITION OF 'ERU' TESTS OF INTELLIGENCE (11+ VERBAL)

Type of Item	Intelligence T1	T2	T3	Vernier S1	S2	S3	Total
Alphabet	8	8	10	3	2	7	38
Always Has	-	-	5	-	2	3	10
Analogies (One answer)	6	6	6	4	5	-	27
Analogies (Two answer)	6	6	4	-	5	-	21
Analogies (Vernon)	-	-	-	-	4	-	4
Classification (General word)	6	6	7	-	-	5	24
Classification (Different one)	6	6	6	-	-	6	24
Code (Alphabetical order)	6	5	4	-	-	-	15
Code (Given coded word)	6	4	-	-	-	5	15
Conditional Instructions)	5	-	5	-	-	-	10
Dictionary Order	-	-	-	-	1	-	1
Jumbled words	6	6	6	-	-	5	23
Letter square	-	5	-	5	-	-	10
Missing number (Addition)	3	3	3	-	-	-	9
Missing number (Subtraction)	3	3	3	-	3	-	12
Number combination	-	-	4	-	4	-	8
Number substitution	-	-	4	-	-	5	9
Opposites (One answer)	6	6	5	4	-	-	21
Opposites (Two answer)	6	6	7	5	-	5	29
Premises (Deductive reasoning)	5	5	5	-	5	-	20
Problems	6	7	7	9	4	3	36
Sequence	6	6	-	5	5	-	22
Series (Letter)	-	-	-	5	5	6	16
Series (Number)	4	-	-	5	5	-	14
Similarities (One answer)	-	6	5	5	-	-	16
Similarities (Two answer)	6	6	4	-	-	-	16
	100	100	100	50	50	50	450

TABLE 36. COMPOSITION OF 'ERU' 11+ TESTS OF ATTAINMENT

Type of Item	English Test E1	E2	E3	All
Abbreviations	5	5	-	10
Comprehension (Prose)	19	23	28	70
Comprehension (Verse)	8	7	5	20
Correctives	11	7	8	26
Derivatives	7	9	10	26
Plurals	7	7	7	21
Poetry (Rhyme and rhythm)	6	4	6	16
Pronunciation	7	7	7	21
Proverbs	5	6	-	11
Punctuation	7	6	7	20
Similes	3	3	-	6
Spelling	14	16	16	46
Synonyms	8	10	12	30
Word meaning	8	10	11	29
Word usage	5	-	3	8
	120	120	120	360

Section I (Mechanical)	Arithmetic Test A1	A2	A3	All
Capacity	3	3	2	8
Length	8	8	9	25
Money	9	9	9	27
Simple rules (a) Addition	4	4	4	12
(b) Subtraction	4	4	4	12
(c) Multiplication	5	5	5	15
(d) Division	6	6	6	18
Time	4	4	5	13
Weight	7	7	6	20
	50	50	50	150

Section II (Problem)	A1	A2	A3	All
Decimals	2	2	1	5
Factors	4	2	3	9
Fractional parts of £1	3	2	2	7
Fractions	6	6	6	18
Mensuration (a) Area	2	2	1	5
(b) Distance	2	2	2	6
(c) Perimeter	1	1	1	3
(d) Volume	-	-	1	1
Money	9	9	9	27
Percentage	-	2	1	3
Profit and Loss	3	3	3	9
Rate, speed and time	3	3	3	9
Reduction	5	5	5	15
Simple Interest	-	-	1	1
Square root	2	2	1	5
Simple rules	8	9	10	27
	50	50	50	150

TABLE 37. COMPOSITION OF 'ERU' ADULT TESTS OF INTELLIGENCE

Type of Item (Verbal)	Verbal Test AV
Alphabet	4
Analogies (Two answer)	4
Analogies (Vernon)	5
Classification (Different one)	4
Dictionary order	1
Letter square	4
Number combination	5
Opposites (One answer)	4
Problems	6
Sequence	4
Series (Letter)	4
Series (Number)	5
	50

Type of Item (Non-verbal)	Non-verbal Test AN		
	Dem.	Prac.	Test
Analogies	2	2	13
Block counting	4	8	11
Formboard (One missing piece)	3	3	4
Formboard (Two missing pieces)	1	1	4
O X O	5	5	6
Sequence	2	2	12
	17	21	50

Explanation:

Dem: Demonstration items
Prac: Practice items
Test: Scored items

TABLE 38. COMPOSITION OF 'ERU' 11+ NON-VERBAL TEST OF INTELLIGENCE

Type of Item	Possible score		Mean Facility value		Mean Efficiency value	
Absurdities	20	(10)	56.5	(39.2)	.49	(.52)
Always Has	20	(10)	59.9	(40.2)	.49	(.61)
Opposites	10	(10)	41.4	(41.4)	.43	(.43)
Analogies	10	(10)	41.9	(41.9)	.49	(.49)
Classification	20	(10)	59.8	(44.6)	.52	(.63)
Completion	20	(10)	59.6	(42.7)	.58	(.68)
Doesn't Belong	20	(10)	57.7	(45.0)	.58	(.67)
Pairs	10	(10)	36.9	(36.9)	.60	(.60)
	130	(80)	54.4	(41.5)	.53	(.58)

Explanation:

Mean facility and efficiency values calculated from performance of sample (264) to whom drafts were administered.

To compute score given in brackets, both alternatives of a 2-response item must be correct to gain credit. Otherwise, alternative responses scored separately except in Opposites and Pairs; in Analogies, there is only one response to each item.

Mean facility and efficiency values in brackets correspond to the former method of scoring; those unbracketed to the latter method.

Entries at foot of 'Possible Score' columns are total scores for test; other entries at foot are grand mean values for test

APPENDIX 5

INSTRUCTIONS FOR ADMINISTERING AND MARKING 'ERU' TESTS

GENERAL INSTRUCTIONS FOR ADMINISTERING "ERU" TESTS

1. IT CANNOT BE TOO STRONGLY EMPHASIZED THAT THE FOLLOWING PROCEDURE AND INSTRUCTIONS SHOULD BE ADHERED TO EXACTLY. In particular, great care must be exercised in the timing of tests and the Supervisor should be provided with a watch which has a seconds hand. The watch should be adjusted so that the minute hand is exactly on a minute mark when the seconds hand points to 60 seconds. A stop-watch should not be used as these are often seriously in error over such a long period of time.

2. The tests are answered in pencil on the pages of the test booklets. Each child should be provided with two sharpened pencils before the test and the Supervisor should have a supply of spare pencils at hand in case any child breaks both pencils during the test. In the rules on the front page of each test the child is told that, if he breaks his pencil during the test, he should change to his other pencil at once or, if he breaks two pencils, to hold up his hand at once and he will be given another.

3. Apart from the test booklets and pencils, no other material is to be allowed on the children's desks: no rulers, rubbers, rough paper, pens etc. Otherwise children will waste much time in rubbing out instead of simply crossing out wrong answers, in laboriously underlining with a ruler and so on. It is usually necessary to stop a few children from using the spare pencil as a ruler or from laboriously underlining with two lines instead of one. All such waste of time should be discouraged.

4. In addition to the Supervisor there should be at least one invigilator to each room. Where the number of children exceeds thirty there should be an additional invigilator for every twenty to thirty children. The Supervisor and invigilators should not leave the room during an examination nor should any other persons be allowed to enter the room.

5. The Supervisor should stand in front facing the children, reading the instructions when necessary, keeping the time with a watch before him, observing that no child looks at his neighbour's paper and generally supervising the whole arrangements. He should not permit himself to be distracted by callers, by talking to anybody, by reading the test booklet himself or by attempting to do any work not connected with the examination during the period. Copying should be carefully guarded against. Children should sit squarely in their seats facing the front and should keep the test booklet flat on their desks. They should not hold them up when re-reading or checking their answers.

6. The other invigilators should patrol the room quietly and unobtrusively, being careful not to stand too long near any one child. They should each have a reserve supply of spare pencils in case any child finds himself without a sharpened pencil, so that no time is wasted. They should see that each child is attentive while the Supervisor is reading or giving instructions. Besides watching the class and observing that no child copies, they should be on the alert to see that the children turn over the pages correctly and that each child, after completing one page, goes straight on to the next without waiting to be told to do so, except at the end of Section I of the Arithmetic Test. They should also see that children DO NOT WASTE TIME by sharpening pencils or in the ways mentioned in paragraph 3. An indication with the finger or a whispered word of explanation is sufficient in these instances. OTHERWISE, NO ASSISTANCE WHATEVER IS TO BE GIVEN. It should be remembered that the tests are designed to measure, among other things, a child's ability/

child's ability to carry out instructions correctly. If in doubt as to how much guidance to give, give ~~none~~ NONE whatever.

7. When giving instructions or reading rules to the children, the Supervisor should speak slowly and deliberately, with due emphasis where necessary and, above all, audibly. The Supervisor should never begin to give, or continue to give, instructions until and unless every single child is silent and attentive.

8. To enable Supervisors to keep a careful check on the "ERU" Tests for which they are responsible, all booklets have been serially numbered from 1 (or 0001) to 1300. These numbers are the same for all five "ERU" tests that are being used. Thus each Supervisor will receive five sets of "ERU" tests bearing, for the sake of convenience, the same series of numbers. These are not to be confused with the candidates' index numbers and no attempt should be made to make the serial numbers of the booklets correspond with the index numbers of the candidates. The booklets have been put up in sealed packets each containing 20 to 30 scripts. The number of scripts that a packet contains is clearly marked on the outside of the packet. The serial numbers of booklets which a packet contains are also clearly marked on the outside of the packet. When returning the scripts to the Education Research Unit, Cross Roads, they should be put back into the packets from which they came whether they are used or unused, and the number of copies and their serial numbers carefully checked with the entry on the outside of the packet. To make the scripts fit the packet it is necessary to turn half of them with the staples to one side and half with the staples to the other side. No marks are to be made on the outside of the packets nor are the packets to be posted without brown paper covering.

9. Before giving out any tests the Supervisor should ascertain how many candidates are present and remove exactly as many scripts from the packets. It is especially requested that the unused scripts from each Centre should represent an unbroken series of serial numbers. Supervisors should see that booklets with the lower serial numbers are given out first. When collecting scripts after any test is finished Supervisors are asked to put them back into numerical order for ease of checking them. The scripts should be replaced in the packets to which they belong at once and each packet sealed with the strip of gummed paper provided in each packet, the gummed paper being initialled by the Supervisor.

EVERY COPY OF EVERY TEST, USED OR UNUSED, WHETHER SPOILED OR NOT, AND EVERY PACKET MUST BE RETURNED TO:

Education Research Unit,
Cross Roads.

BY REGISTERED MAIL.

For the sake of convenience it is being arranged that Supervisors should also return the English Essay and the General Knowledge papers to the Education Research Unit. These may be wrapped up, together with the packets containing the "ERU" Tests, into one parcel.

A Beaubrun Ogg

Education Research Officer.

Education Research Unit,
Cross Roads.
27th August, 1948.

SPECIAL INSTRUCTIONS FOR ADMINISTERING "ERU" TESTS

Paragraphs 1, 2 and 3 refer to the administration of ALL "ERU" Tests.

1. The Supervisor distributes the test booklets with front page uppermost, having previously warned the children that they are not to turn over or open the booklets until they are told.

2. The Supervisor then supervises the filling in of such particulars as are asked for on the title page of the test, taking one item at a time and giving necessary instructions and illustrations. It is always necessary to remind children to give the year of birth as well as the day and month. Some of the data may, if necessary, be written on the blackboard for the children to copy. The other invigilators should supervise the filling in of these particulars.

3. When the children have filled in the particulars on the front page, the Supervisor calls them to attention and reads clearly, emphatically and without haste the rules at the bottom of the front page of the booklet. He should say:
"Now listen carefully while I tell you the rules of this test.
"Do you see where it says 'Read this carefully'? (holding up a test booklet and pointing to the place) I shall read these rules to you "and you follow them as I read them."
The Supervisor then reads the rules, (see the cover-pages of each test which accompany these instructions) once and once only, taking care to read the number of each rule before the rule itself, and insisting that every candidate follow on his own booklet.

4. From this point the Supervisor proceeds as described below according to which particular test is being administered.

4a. Preliminary Practice Test.

As soon as the rules are read, The Supervisor says:
"When I say 'Turn over', you are to turn over your paper and read for "yourself the instructions at the top of the page and begin work at "once. As you finish each question go on to the next at once without "waiting to be told. Remember to work as quickly and as carefully as "you can. Turn over. BEGIN."

The Supervisor writes down the exact time (hour, minutes, seconds) when he says "Begin" and also what the time (hour, minutes, seconds) will be 10 minutes later.

After exactly 10 minutes he says:
"STOP. Pencils down. Turn your papers over."
Candidates may not be allowed to finish the question they are busy doing when the Supervisor says "STOP".

The test papers are then collected and, as soon as possible, rearranged in order of their serial numbers and checked to make sure that all have been returned. They are then replaced in the proper packet and sealed with the gummed strips provided in the packet.

4b. Intelligence.

As soon as the rules are read the Supervisor says:
"When I say 'Turn over', you are to turn over to page 1 and read for "yourself the instructions at the top of the page and begin work at "once. As you finish each page go on to the next at once without "waiting to be told. Remember to work as quickly and as carefully as "you can. Turn over. BEGIN."

The Supervisor writes down the exact time (hour, minutes, seconds) when he says "Begin" and also what the time (hour, minutes, seconds) will be 15, 30, 45 and 60 minutes later.

After exactly 15 minutes he says:
"A quarter of an hour has gone; you have three quarters of an hour "more."

After exactly 30 minutes he says:
"Half an hour has gone; you have half an hour more."

After exactly 45 minutes he says:
"Three quarters of an hour have gone; you have a quarter of an hour "more."

After exactly 60 minutes he says:
"STOP. Pencils down. Close your books."
Candidates may not be allowed to finish the question they are busy doing when the Supervisor says "STOP".

The test booklets are then collected and, as soon as possible, rearranged in order of their serial numbers and checked to make sure that all have been returned. They are then replaced in the proper packets and sealed with the gummed strips provided in the packets. The scripts should not be allowed to lie around outside the packets as there is serious danger of scripts of one test being confused with scripts of another test as they are almost identical in appearance.

4c. Intelligence (supplementary).

As soon as the rules are read the Supervisor says:
"When I say 'Turn over', you are to turn over to page 1 and read for "yourself the instructions at the top of the page and begin work at "once. As you finish each page go on to the next at once without "waiting to be told. Remember to work as quickly and as carefully as "you can. Turn over. BEGIN."

The Supervisor writes down the exact time (hour, minutes, seconds) when he says "Begin" and also what the time (hour, minutes, seconds) will be 10, 20 and 30 minutes later.

After exactly 10 minutes he says:
"Ten minutes have gone; you have twenty minutes more."

After exactly 20 minutes he says:
"Twenty minutes have gone; you have ten minutes more."

After exactly 30 minutes he says:
"STOP. Pencils down. Close your books."
Candidates may not be allowed to finish the question they are busy doing when the Supervisor says "STOP".

The test booklets are then collected and, as soon as possible, rearranged in order of their serial numbers and checked to make sure that all have been returned. They are then replaced in the proper packets and sealed with the gummed strips provided in the packets. The scripts should not be allowed to lie around outside the packets as there is serious danger of scripts of one test being confused with scripts of another test because they are almost identical in appearance.

4d. Arithmetic.

As soon as the rules are read the Supervisor says:
"When I say 'Turn over', you are to turn over to page 1 and read for "yourself the instructions at the top of the page and begin work at "once. As you finish each page go on to the next at once as far as "page 14. Do not turn over to page 15 until you are told. Remember to "work as quickly and as carefully as you can. Turn over. BEGIN."

The Supervisor writes down the exact time (hour, minutes, seconds) when he says "Begin" and also what the time (hour, minutes, seconds) will be 10, 20 and 30 minutes later.

After exactly 10 minutes he says:
"Ten minutes have gone; you have twenty minutes more."

After exactly 20 minutes he says:
"Twenty minutes have gone; you have ten minutes more."

After exactly 30 minutes he says:
"STOP. Pencils down. Listen carefully. When I say 'Turn over' "you are to turn over to page 15, Section 2, and read for yourself "the instructions at the top of the page and begin work at once. "When you finish page 15 go on to ~~page 4~~ the other pages at once without waiting "to be told. Do not turn back to pages 1, 2, ~~and 3~~ 4 at all. "Remember to work as quickly and as carefully as you can. "Turn over. BEGIN."

(At this point the invigilators should move about the room to make sure that all children have turned over to page 5. After this point they may not turn back to pages 1, 2, 3 & 4.)

The Supervisor writes down the exact time (hour, minutes, seconds) when he says "Begin" and also what the time (hour, minutes, seconds) will be 10, 20 and 30 minutes later.

After exactly 10 minutes he says:
"Ten minutes have gone; you have twenty minutes more."

After exactly 20 minutes he says:
"Twenty minutes have gone; you have ten minutes more."

After exactly 30 minutes he says:
"STOP. Pencils down. Close your books."
Candidates may not be allowed to finish the question they are busy doing when the Supervisor says "STOP".

The test booklets are then collected and, as soon as possible, rearranged in order of their serial numbers and checked to make sure that all have been returned. They are then replaced in the proper packets and sealed with the gummed strips provided in the packets. The scripts should not be allowed to lie around outside the packets as there is serious danger of scripts of one test being confused with scripts of another test because they are almost identical in appearance.

4e. English.

As soon as the rules are read the Supervisor says:
"When I say 'Turn over', you are to turn over to page 1 and read for "yourself the instructions at the top of the page and begin work at "once. As you finish each page go on to the next at once without "waiting to be told. Remember to work as quickly and as carefully as "you can. Turn over. BEGIN."

The Supervisor writes down the exact time (hour, minutes, seconds) when he says "Begin" and also what the time (hour, minutes, seconds) will be 15, 30, 45 and 60 minutes later.

After exactly 15 minutes he says:
"A quarter of an hour has gone; you have three quarters of an hour "more."

After exactly 30 minutes he says:
"Half an hour has gone; you have half an hour more."

After exactly 45 minutes he says:
"Three quarters of an hour have gone; you have a quarter of an hour "more."

After exactly 60 minutes he says:
"STOP. Pencils down. Close your books."
Candidates may not be allowed to finish the question they are busy doing when the Supervisor says "STOP".

The test booklets are then collected and, as soon as possible, rearranged in order of their serial numbers and checked to make sure that all have been returned. They are then replaced in the proper packets and sealed with the gummed strips provided in the packets. The scripts should not be allowed to lie around outside the packets as there is serious danger of scripts of one test being confused with scripts of another test because they are almost identical in appearance.

5. AFTER ANY TEST HAS STARTED THE SUPERVISOR AND INVIGILATORS ARE TO ANSWER NO QUESTIONS WHATEVER. Raised hands should be ignored except where the child has broken both pencils and needs another.

Important Note.

The instructions printed in red must not be omitted under any circumstances. The words given should be adhered to exactly and no omissions, additions or variations should be made.

LOCAL SCHOLARSHIP EXAMINATION 1949

Time and Script Record Sheet for ERU Tests

Test	Enter times in this Column	Stage of Test	Scripts	Serial Numbers From: To:	No. of Scripts
PRACTICE TEST	.....	BEGIN	Sent	....	.....
	.....	STOP	Used	....	.....
			Unused	....	.....
			Total	....	.....
INTELLIGENCE	.....	BEGIN	Sent	....	.....
	.....	¼ gone ½ to go	Used	....	.....
	.....	½ gone ¼ to go	Unused	....	.....
	.....	STOP	Total	....	.....
ARITHMETIC Section I	.....	BEGIN	Sent	....	.....
	.....	10 mins. gone	Used	....	.....
	.....	20 mins. gone	Unused	....	.....
	.....	STOP. Turn over to page 5.	Total	....	.....
Section II	.....	BEGIN			
	.....	10 mins. gone			
	.....	20 mins. gone			
	.....	STOP			
ENGLISH	.....	BEGIN	Sent	....	.....
	.....	¼ gone ½ to go	Used	....	.....
	.....	½ gone ¼ to go	Unused	....	.....
	.....	STOP	Total	....	.....
INTELLIGENCE (Supplementary)	.....	BEGIN	Sent	....	.....
	.....	10 mins. gone	Used	....	.....
	.....	20 mins. gone	Unused	....	.....
	.....	STOP	Total	....	.....

Name of School ..... Signed .....

Parish ..... Date 1949

CERTIFICATE OF COMPLIANCE WITH INSTRUCTIONS

I administered the "ERU" Tests in the 1949 Local Scholarship Examination in complete accordance with the Instructions with (a) no exceptions whatever. (b) the undermentioned exceptions.
(Strike out whichever does not apply)

Describe, briefly but precisely, the deviations (if any) from the Instructions that occurred. It is very important that no such deviations should occur but if, through inadvertence or error, any do occur, it is equally important to know their exact nature.
(A separate sheet may be used if necessary)

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Date.....1949 Signed..... .....Centre

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Receipt for Local Scholarship Examination scripts, Instructions etc.

Please sign and return this receipt as soon as you have received and checked all materials enumerated. The list does not include any material sent from the Education Department.

I have received the following materials for the conduct of the Local Scholarship Examination, 1949:

1 .... sealed parcels of scripts.
2 .... copies of General Instructions for Administering ERU Tests
(One copy to be given, in advance, to each Invigilator)
3 One copy of Special Instructions for Administering ERU Tests.
4 One Time and Script Record Sheet.
5 One blank Certificate of Compliance with Instructions.
6 One set of cover pages of each of 5 (five) ERU Tests.
7 One page of Instructions marked "Confidential".
8 One copy of letter from the Education Research Officer.

Date.....1949 Signed..... .....Centre

To be returned to the Education Research Unit, Mandeville.

INSTRUCTIONS FOR MARKING ERU TESTS

Subsequent research involving the use of worked scripts is greatly facilitated by STRICT COMPLIANCE WITH THESE INSTRUCTIONS (especially paragraphs 3, 4 and 7)

1. Mark with blue pencil.

2. Answer key should be strictly followed. Doubtful or ambiguous answers should be decided BY THE MARKING SUPERVISOR in accordance with detailed Instructions below. Refer all such cases to the Marking Supervisor. When the Supervisor is not present write on the front page of the test:- "Query item 67" or whatever is the number of the question about which doubt has arisen.

3. In the right hand margin put the mark (/) for correct and (\ ) for wrong or no answer at all. So that the scores may be added more easily, keep these marks in separate columns; correct marks (/) in the left column and wrong marks (\ ) in the right, (but both columns in the right hand margin). Keep the columns perfectly vertical and quite distinct from each other. Keep these marks small and directly opposite the question to which they relate. LEAVE NO ITEMS UNMARKED EVEN THOUGH NOT ATTEMPTED.

4. If, by mistake, a correct answer is marked wrong (\ ) or a wrong answer is marked correct (/) simply change the mark to a cross (X) and mark the item again with the proper mark in the proper column. Such crosses are ignored when adding up marks.

5. Each question correctly answered counts 1 point. NO HALF MARKS ARE TO BE GIVEN. Where a question requires an answer in two or more parts all parts must be correct to credit one mark.

6. Where a pupil has changed his answer, credit is to be given if the final intention is clear and correct but see detailed Instructions below and refer any doubtful cases for decision BY THE MARKING SUPERVISOR.

7. The score on each page should be entered in the outside corner at the foot of the page (i.e. left corner on left-hand pages but right corner on right-hand pages) and also in the space provided on the title page. Check this score by adding to it the total of the wrong (\ ) marks. NEVER OMIT THIS CHECK. This combined total should equal the total number of questions on the page which is shown in a circle at the foot of the answer key.

8. Marking is greatly facilitated if the correct answers are memorised. This can be quickly achieved in the process of marking by taking care to repeat (mentally) only the correct answers when comparing key and script. NEVER REPEAT THE ANSWERS IN THE SCRIPT YOU ARE MARKING.

9. If one person is correcting single-handed a set of scripts, he should correct the first page of each test before going on to the second page, the second page before the third, and so on. The answers are thus more easily memorised.

10. If several people are engaged in marking a large number of tests, half of them should be occupied solely in marking. The remainder should be occupied solely in checking; these should be people who have proved their accuracy and reliability in marking.

11. Scripts must always be checked after they have been marked. This applies to the marking of each individual question, to the page total at the foot of the page and on the front cover and also to the grand total for the whole script. If it is found necessary to make any alteration of the initial marking, this should be done in red pencil by striking out the wrong marking and adding the correct marking by its side. Do not attempt to change figures by writing over them. Each such alteration should be initialled by the person making the alteration.

ucation Research Unit,
Mandeville, Jamaica.

21st December, 1949

SEE BACK PAGE FOR SPECIMEN MARKED PAGE

169

12. In marking all tests the aim is to establish a UNIFORMLY OBJECTIVE SYSTEM OF MARKING. Therefore the list of correct answers given on the answer key must be adhered to STRICTLY. For this reason, in cases where ambiguities have arisen in the past, these have been decided with the aim of making the distinction between "right" and "wrong" as clearly defined as possible.

13. For the same reason, all marking should be under the direction of one Marking Supervisor and his/her decision is to be final. The Marking Supervisor should be thoroughly conversant with these instructions and should aim at ABSOLUTE CONSISTENCY.

14. Subject to the aims mentioned in paragraph 1, the child is to be given credit for having done correctly what he was required to do. Therefore, in all items, except where otherwise stated, credit is to be given if the child's intention is CLEAR and CORRECT although the method of answering is wrong, e.g. by crossing out instead of underlining, by marking the answer with a ✓ instead of underlining, by enclosing the answer in brackets instead of underlining (but in this latter case credit is given only if the answer is enclosed within two brackets made by the child.

15. However, if a child is required to underline one word out of several and, instead of doing so, underlines all the words except the right one, the answer is wrong. It must be remembered that these tests contain no items designed solely to measure ability to carry out instructions, such exercises often being found in Intelligence Tests. Instead, the ability to carry out instructions is required in all kinds of items. Therefore, too much leniency should not be given where instructions have not been followed implicitly. This ruling is not applied so stringently in Arithmetic and English which are tests of attainment or knowledge and not of intelligence or innate ability.

16. All items not marked "right" are marked "wrong". Thus blanks are marked wrong. Leave no items unmarked even though not attempted.

17. If an answer is to be underlined but the child writes it instead, credit is given (a) if the answer is absolutely identical with the answer to be underlined, and (b) if it is spelt correctly and (c) if nothing has been underlined in the brackets.

18. Where a child writes a letter or figure over another letter or figure and the result is indistinct, effort is to be made to find out which letter or figure is the child's final intention. Holding the paper to the light at various angles may help to determine which letter or figure is on top. The same instructions hold where an underlining appears to have been crossed out and no other word underlined. In such a case it is necessary to decide whether the horizontal or the oblique line is on top as the child may have underlined a word, crossed it out and then tried to underline it again.

19. However, if cases such as those mentioned in 18 are examined carefully and still found to be doubtful, the answer should be marked wrong as the child has already been warned not to do such things. Refer such cases to the Marking Supervisor for final decision.

20. A great deal of difficulty is occasioned by children who begin to underline a wrong answer and then, realizing it is wrong, stop doing so but do not cross out the partial underlining made. In the case of a one word answer, if the wrong underlining is more than one-quarter the length of the word, the answer is wrong. In the case of an answer consisting of many words (most frequent in English) the answer is wrong if more than one word of the wrong answer is underlined even though the whole of the correct answer is underlined.

21. When the right answer is "t" and the answer looks like "t" but is not crossed, the answer is wrong. If the cross stroke is clearly present but does not actually touch the vertical stroke this is right e.g. t. If this ruling be not followed ambiguity arises between (the letters) "l" and "t".

22. For the same reason an undotted "i" cannot be accepted as a correct "i". This leads to ambiguity between "i" and "e".

23. In exception to these two rules, where it is evident from the child's other answer and the writing on the cover page, that the child regularly makes clearly looped "e"s and "l"s and definitely unlooped "i"s and "t"s, an undotted "i" or an uncrossed "t" may be accepted as "i" or "t", provided there is no suggestion of a loop.

24. When trying to decipher a doubtful answer rough work should be considered if any is shown, especially in Arithmetic. However, credit may not be given if the answer in rough be correct but the answer in the proper place be definitely wrong.

25. When in doubt about a letter or figure, other letters or figures in that child's book should be taken into consideration in deciding what is the child's intention.

26. Reversals of letters or figures are not accepted.
"ɘ" and "Ǝ" are not accepted as substitutes for "e" and "E"
"ᴎ" and "И" are not accepted as substitutes for "n" and "N"
"Ɛ" and "Ⅎ" are not accepted as substitutes for "3" and "4".

27. If a child underlines the right answer in the brackets but also underlines something outside the brackets, the answer is marked right provided that nothing else be underlined inside the brackets.

INTELLIGENCE (ERU T1)

Items 1-5: The answer in each case may be a capital or small letter and may be either printed or written.

Item 2: The answer "II" is right. "PI" is wrong.

Items 6-11: If the whole word is written instead of only the last letter, the answer is wrong even though the word be correctly spelt; but, if the last letter is written in addition to the whole word or if the last letter of the whole word is underlined the answer is right if the whole word be correctly spelt.

Items 18-23: If a child writes out the general word instead of underlining it, give credit if the word is spelt correctly and nothing is underlined in the brackets. Credit is also given if the child writes the plural form of the word e.g. "animals"; "games", "furnitures", "vegetables", "senses", "coins". (Note especially that credit is given for "furnitures").

Item 36: If the whole word "September" be written, it is wrong even though it be spelt correctly; but, if the whole word "September" be written out and in addition the letter "S" is given/underlined credit is given if the whole word is spelt correctly. or

Item 45: Care must be taken to distinguish between "V" and "U".

Item 52: Credit must be given when a child crosses out a 5 as in "borrowing". The following answers are right:
5, $^{4}\not{D}$, $^{5}\not{D}$, where D represents any digit.

Item 79: "Thursday", written in full or abbreviated, is wrong even though it be correctly spelt; but, if "Thursday" be written in full or abbreviated and in addition the letter "T" be also given or underlined, the answer is right if the word be spelt correctly

Items 97-100: Right answers in wrong places are WRONG i.e. the number for the beginning of the series must be at the beginning and the number for the end of the series must be at the end.

SUPPLEMENTARY INTELLIGENCE (ERU S1)

Item 1: "CEHLOST" is wrong, "CEHLOST" (with "L" underlined) is right.

Item 8: "11.50" with or without "a.m." is right; "11.50 p.m" is wrong "10.12" and "10-12" are both wrong but "10 to 12" is right. "10 minutes till noon" and "10 till 12" are both right.

Item 9: "7.10" with or without "p.m." is right; "7.10 a.m." is wrong. "10 past 7" is right; "50 minutes to 8" is wrong.

Item 10: "8" with or without "a.m." is right but "8 p.m." is wrong. "8 o'clock" is right.

Item 13: "One" is right.

Item 21: "20.11" and "20-11" are both wrong. "20 to 11" is right.

Items 41-50: The right answers must be in the right places.

Items 44 & 45: The letters must be in the correct order
i.e. DC, NM, KJ, PO are wrong; CD, MN, JK, OP are right.

Item 50: "$0\frac{1}{2}$" may be accepted as "$\frac{1}{2}$".

Turn over to Page 4

171

ARITHMETIC (ERU A1)

A General remarks relating to whole test

1. In answers with remainders, the remainder must be present and correct but care should be taken to interpret the child's intention correctly, e.g. in Question 7, the following answers are right: (442 R7), (442.7R), (442.7), (442 7), (442 - 7) & (442$\frac{7}{9}$) BUT, (442 0 7) is wrong.

2. If question says: "Write in figures", words are not accepted

3. Some children have difficulty putting pounds, shillings and pence in the correct places in "money problems". If the child's intention is quite clear give credit. Example A (below) is right because the "d" is quite distinct although the "6" is under the "s". Similarly, Example B is right.

Example A	s.	d.
		6d

Example B	s.	d.
		6/-

Every case of this kind should be referred to the Marking Supervisor.

B Special remarks relating to individual items in ARITHMETIC.

SECTION I Item 31: "108 cwt." is wrong.

Item 39: "7 yd. 2 ft. 10 in. 9 lines" is right,

Item 41: "33 gal. 1 qt." is right, but "qt." or "quart" must be given

SECTION II Item 3: "08" is right.

Item 5: "8 x 8" and "8 x 8 = 64" are both right.
"2 x 2 x 2 x 2 x 2 x 2" is right; "2" (alone) is wrong.
"4 x 4 x 4" is right; "4" (alone) is wrong.

Item 13: "60" under "d.", with or without "5" under "s.", is wrong.

Item 17: "One and a quarter" and "1 and a $\frac{1}{4}$" and "$\frac{5}{4}$" are all right.

Item 19: "16 x 6" and "16 x 6 = 96" are both right.

Item 21: "·125" is right.

Item 23: The only right answer is "$6\frac{2}{3}$". "$6\frac{4}{6}$" is wrong.

Item 27: "27 x 3" and "27 x 3 = 81" are both right.

Item 32: The decimal point must be present, BUT "$11\frac{1}{10}$" is right.

Item 35: Answer must be in lowest terms i.e. "$\frac{3}{8}$" BUT, "·375" is right

Item 39: "16 x 15" and "16 x 15 = 240" are both right.

Item 44: "18 x 18" and "18 x 18 = 324" are both right.

Item 45: The position and/or absence of the comma in "60,000" is disregarded. "Sixty thousand" is right.

Item 49: The decimal point must be present but "$7245\frac{1}{5}$" is right.

ENGLISH (ERU E1)

A General remarks relating to whole test

1. In Spelling questions (13 - 19 and 62 - 68), accept as right
(a) the whole word spelt correctly, written in the brackets (or outside the brackets) insisting on capital letters in Questions 13: April; 14: Saturday; 63: March;
(b) the skeleton word completed clearly and correctly by simple insertion of the missing letters, UNLESS anything be in the brackets;
(c) the writing of only the missing letters in order in the brackets, EXCEPT THAT, where the missing letters belong to two or more separate spaces, they must be so grouped as to leave no doubt that the child knows where they belong.

2. Capital letters are disregarded except where specified in these Instructions or where a capital letter is underlined on the key.

3. In certain questions e.g. 1-5, 20-27 etc., if a child writes out the answer instead of underlining it, credit may be given if the answer be absolutely identical with the printed word or phrase and if nothing be underlined in the brackets. Every word (AND NO OTHERS) must be given and EVERY word must be spelt correctly.

4. Partial underlining of an answer consisting of many words is right (if it is the right answer and if no other answer be wholly or partially underlined) e.g. Questions 1, 30, 31, 39 -43 etc. (See also page 2, paragraph 20.)

5. Be careful to detect peculiarities of writing or printing.

172

B Special remarks relating to individual items in ENGLISH

Item 2: "Consented" and "she consented" are both right. ALL other answers are wrong. Spelling must be correct.

Item 3: "Betty" must be spelt correctly and must have a capital "B".

Item 4: If 2, 3, 4, 5 and 6 are all underlined the answer is wrong.

Item 5: "Ruth" must be spelt correctly and must have a capital "R".

Items 6-12: The words must be spelt correctly. If a child adds extra words, accept the word required if it is there at all, and ignore any other words that may be there, irrespective of grammar, e.g. "Both of them women had blue dresses" is right.(Question 8)

Item 16: "Oceans" (plural) is wrong.

Item 18: "Palace" need not have a capital "P".

Item 41: "In Charlie's trousers" is wrong.

Item 42: "Sympathetic" must be spelt correctly. "Sympathetic" and "They were sympathetic" are both right; any other answer is wrong

Item 53: "Implore" must be spelt correctly. It need not have a capital "I". "His mother implore" is also accepted but nothing else. "Implored" and "his mother implored" are both wrong.

Items 56-61: Markers, BUT ESPECIALLY CHECKERS, should be cautioned to use extreme care here as errors are frequently made in marking.

Item 60: The correct answer is "did" i.e.the "did" which stands alone in the brackets. If a child underlines the word "did" in the phrase "had did", the answer is wrong.

Item 61: The correct answer is "any" i.e.the "any" which stands alone in the brackets. If a child underlines the word "any" in the phrase "not any", the answer is wrong.

Item 62: "Friends" is wrong.

Item 65: The answer must be "oranges" (plural). "Orange" is wrong.

Item 66: "Presented", "produced" and "prepared" are all right.

Item 67: "Ghosts" is wrong. "Guest" (singular) is wrong.

Item 68: "Currents" (plural) is wrong.

Item 75: "Actions" (plural) is wrong.

Item 77: If a child underlines the answer "West Indies" together with the one word "British" in either "British East Indies" or "British West Indies", the answer is wrong.

Item 80: "Etcetera" is wrong unless "and so on" be also underlined.

Item 85: The only right answer is "disappointment", spelt correctly.

Items 86-90: MARKERS SHOULD BE WARNED TO TAKE GREAT CARE IN THESE ITEMS. The spelling must be considered; therefore it is of no use simply to memorize the words. Special care should be observed in Item 90: the apostrophe must be in the correct place.

Items 91-97: If the right punctuation mark is not underlined but is written in the right place in the sentence, it is right UNLESS a wrong mark be underlined in the brackets; this makes it wrong.

Items 92&93: These are two separate questions which must be marked separately though they appear in the same sentence.

Item 94: Both commas must be underlined to be right. (One question)

Items 98-103: If the right word be written in the blank space in the poem, the answer is right, UNLESS any wrong answer be underlined in the brackets. In space B, if a child makes the word "noBody" by putting "no" before the printed "B" and "ody" after it (but does not actually write the letter "b") the answer is right.

PLEASE SUBMIT A FULL LIST OF DOUBTFUL ANSWERS, NOT SPECIFIED ABOVE, SO THAT MARKING MAY BE MADE STILL MORE UNIFORM AND OBJECTIVE IN FUTURE.

Turn over for Specimen marked page (Page 2 of English)

Specimen marked page of ERU M1 to illustrate Marking Instructions

In each of the next sentences the word which is underlined has some letters missing. Find out what the word is and then write it in the brackets. Spell it correctly.

Here is an example:-

The thief was caught by a p c ma . (policeman)

The word underlined is POLICEMAN, so we have written POLICEMAN in the brackets.

Now do these. Be sure to write the word IN THE BRACKETS. Write the whole word; write it clearly; spell it correctly.

13. St. George's Day is on the 23rd of A l. (...April.....) ✓
(p.4 §§ 1(a) & 2)
14. Sa ay is the day before Sunday. . (Saterday....) ✗
(p.1 §4)
15. The mother made a new dress for her
d ter. . . . . (..augh.....) ✓
(p.4 §1(c))
16. Large ships cross the ocean. . . . (.....) ✓
(p.4 §1(b))
17. Did you re ber to bring your book? . (.....) ✓
(p.4 §§1(a)&2) Remember
18. The King lives in Buckingham Palace. . (..Pallace....)
(p.4 §1(b))
19. Water is a l q d. . . . . (...lui.....)
(p.4 §1(c))

In the next questions underline in the brackets the word which means most nearly the SAME as the word in capital letters.

Here is an example:-

Although he has done me harm, I shall PARDON him.
(punish / love / reward / forgive / hit / please)

PARDON means nearly the same as FORGIVE, and so we have underlined FORGIVE in the brackets.

Now do these.

20. The men HASTENED to work.
(p.3 §27) (walked / hurried / cycled / came / went / returned) ✓

21. They tried to climb to the PEAK of the mountain.
(p.1 §4) (ridge / brow / top / bottom / side / range) ✗

22. The boy INJURED his right arm.
(p1§6) (touched / turned / raised / hurt / pushed / placed) ✓
(p3§27)
23. They lost all their POSSESSIONS
(p2§20) (clothes / books / jewels / tools / food / belongings)

24. There is no REMEDY for this disease. Cure
(p2§17) (cure / name / help / doctor / hope / hospital) ✓

25. In spite of his POVERTY he was happy. poorness
(p2 (illness / operation / injury / position / loneliness / poorness)
§17c)
26. Long ago Englishmen DREADED the plague. feered
(p2 (enjoyed / ignored / fought / feared / caught / died of)
§17b)
27. That punishment was JUST. right
(p3 §27) (mild / harsh / unfair / undeserved / nothing / fair) ✓

The numbers in brackets BENEATH the number of each question refer to the explanation of the marking to be found in preceding pages. Note that "p" stands for "page" and "§" stands for "paragraph".

Marginal marks: p.1 §§ 3 & 4 Foot total: p.1 §§ 5 & 7

APPENDIX 6

SPECIMEN RAW SCORE DISTRIBUTIONS AND CONVERSION TABLE

Education Authority: JAMAICA SURVEY (1949) Test: INTELLIGENCE 2 Date of Test: 30th JUNE 1949. Ages in years and completed months at: 30th JUNE 1949. Boys or Girls: BOTH

Age at Test date $	11.0																								
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTALS
Score Age ↓ Official																									
	@		@		@		@		@		@		@		@		@		@		@		@		
95-100	–	–	–	–	–	–	–	–	1	–	1	–	–	1	–	–	–	–	1	2	2	–	3	3	14
90-94	–	–	–	–	1	–	–	–	1	–	–	–	1	–	1	–	1	1	1	1	1	2	1	1	13
85-89	–	–	–	–	–	1	1	–	1	2	–	–	–	–	–	3	1	1	–	2	–	2	1	–	15
80-84	1	–	–	–	–	–	–	1	1	–	–	–	1	3	–	–	2	2	–	1	–	–	4	2	18
75-79	–	–	–	–	–	–	–	–	1	1	1	–	–	1	–	–	–	2	2	1	1	–	2	–	12
70-74	1	–	1	1	–	3	1	–	–	–	1	1	1	–	–	3	–	3	2	1	2	3	1	2	27
65-69	–	1	–	2	2	–	–	2	1	–	1	–	1	1	–	–	–	1	–	1	1	1	1	1	17
60-64	–	–	–	–	–	1	–	1	–	2	–	2	–	–	1	3	1	2	1	–	–	2	2	–	18
55-59	1	–	–	1	–	–	–	–	1	–	–	2	3	1	2	1	2	2	1	2	1	–	4	–	24
50-54	–	–	1	–	1	1	1	1	1	3	–	–	–	–	2	–	1	8	2	3	–	4	4	–	33
45-49	–	1	1	–	1	–	1	–	–	2	1	–	1	–	1	1	1	2	2	2	1	3	5	1	27
40-44	1	–	1	–	1	1	3	2	–	1	2	1	–	1	3	2	3	7	1	2	–	3	8	5	48
35-39	1	–	–	2	2	2	–	2	2	–	1	1	–	2	2	2	3	2	3	3	1	3	4	1	39
30-34	2	1	–	1	3	5	1	–	2	2	4	1	–	–	4	–	4	8	5	–	1	–	4	6	54
25-29	3	2	2	2	–	3	2	1	4	2	5	1	1	3	2	1	4	10	1	2	5	–	1	4	61
20-24	3	2	2	2	1	4	3	1	3	4	6	4	2	2	8	3	2	18	5	1	4	2	10	6	98
15-19	2	5	3	5	3	7	5	3	2	6	2	4	1	2	7	3	1	21	8	3	3	3	12	7	118
10-14	8	6	4	6	3	21	14	14	6	8	5	6	3	5	10	5	7	22	10	6	6	7	18	8	208
5- 9	9	4	13	11	11	39	14	8	7	11	17	8	7	10	18	14	11	44	11	10	6	9	17	16	325
0- 4	41	30	66	31	39	173	75	35	21	30	60	30	33	34	40	29	27	153	45	23	25	22	63	28	1159
TOTALS	73	52	94	64	68	261	121	71	55	74	107	67	55	66	101	70	71	309	101	66	60	66	165	91	2328

@ Please leave these columns blank. NOTES.
$ Please leave these rows blank.

(1) Please enter in the "AGE" row official ages month by month, starting with the lowest month group, e.g., 10:6, 10:7, etc.
(2) The entry in each cell of the table should show the number of children of age at head of column who get test scores within the range shown on the left.

TABLE 41. JAMAICA LOCAL SCHOLARSHIP EXAMINATION (1948)
RAW SCORE DISTRIBUTION (SUPPLEMENTARY - S1)

Education Authority: JAMAICA LSE/48 | Test: SUPPLEMENTARY | Date of Test: 4th SEPT. 1948 | Ages in years and completed months at: 31st AUGUST 1948 | Boys or Girls: BOTH

Age at Test date → / Score Age ↓ Official	10:8	10:9 @	10:10	10:11 @	10:0	11:1 @	11:2	11:3 @	11:7	11:5 @	11:6	11:7 @	11:8 @	11:9	11:10 @	11:11	12:0	12:1 @	12:2	12:3 @	12:4	12:5 @	12:6	12:7 @	TOTALS
11:0																									
11:1																									
11:2																									
11:3																									
11:4																									
11:5																									
11:6																									
11:7																									
11:8																									
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12:1																									
12:2																									
12:3																									
12:4																									
12:5																									
12:6																									
12:7																									
95-100																									
90-94																									
85-89																									
80-84																									
75-79																									
70-74																									
65-69																									
60-64																									
55-59																									
50-54																									
45-49	1	–	–	1	3	1	1	1	2	1	2	5	2	–	3	–	3	1	2	4	1	1	1	1	37
40-44	1	3	2	2	2	3	1	2	3	2	2	5	3	1	3	3	1	8	6	2	2	2	4	7	70
35-39	–	1	2	–	2	2	–	5	5	3	3	4	5	1	5	5	6	3	5	10	2	10	2	5	86
30-34	1	1	2	–	1	2	5	3	5	2	2	5	4	1	3	5	3	5	5	5	9	3	2	4	77
25-29	–	1	3	3	5	3	3	5	3	2	2	3	4	6	5	7	4	2	3	3	7	1	–	2	77
20-24	6	1	4	1	4	4	4	2	4	2	6	5	3	3	8	5	4	5	11	4	5	9	9	2	109
15-19	1	–	6	5	3	1	5	5	2	2	4	5	5	2	4	4	3	7	7	9	6	8	6	7	107
10-14	4	3	5	2	3	4	5	4	4	3	6	7	8	10	4	3	5	8	6	5	10	7	7	6	129
5-9	2	2	3	5	4	4	3	2	4	6	10	9	6	7	11	6	11	8	5	9	7	9	2	10	145
0-4	–	2	1	1	2	5	4	1	4	3	3	3	5	4	2	4	4	8	1	3	3	3	5	2	72
TOTALS	16	14	28	20	29	28	31	30	36	26	40	50	44	34	48	42	44	55	50	54	52	52	38	46	907

@ Please leave these columns blank.
$ Please leave these rows blank.

NOTES.
(1) Please enter in the "AGE" row official ages month by month, starting with the lowest month group, e.g., 10:6, 10:7, etc.
(2) The entry in each cell of the table should show the number of children of age at head of column who get test scores within the range shown on the left.

Education Authority: JAMAICA LSE/48 Test: SUPPLEMENTARY / Date of Test: 4th SEPT. 1948 Ages in years and completed months at: 31st AUGUST 1948 Boys or Girls: BOTH

Age at Test date	10:8	10:9	10:10	10:11	10:0	11:1	11:2	11:3	11:4	11:5	11:6	11:7	11:8	11:9	11:10	11:11	12:0	12:1	12:2	12:3	12:4	12:5	12:6	12:7	TOTALS
Score Age ↓ Official	11:0	11:1	11:2	11:3	11:4	11:5	11:6	11:7	11:8	11:9	11:10	11:11	12:0	12:1	12:2	12:3	12:4	12:5	12:6	12:7	12:8	12:9	12:10	12:11	
		@		@		@		@		@		@		@		@		@		@		@		@	
95-100																									
90-94																									
85-89																									
80-84																									
75-79																									
70-74																									
65-69																									
60-64																									
55-59																									
50-54																									
45-49	1	–	–	1	3	1	1	1	2	1	2	5	2	–	3	–	3	1	2	4	1	1	1	1	37
40-44	1	2	2	2	2	3	1	2	3	2	2	5	3	1	3	3	1	8	6	2	2	2	4	1	70
35-39	–	1	2	–	2	2	–	5	5	3	3	4	5	1	5	5	6	3	5	10	2	10	2	5	86
30-34	1	1	2	–	1	2	5	3	5	1	2	5	4	1	3	5	3	5	5	5	9	3	2	4	77
25-29	–	1	3	3	5	3	3	5	3	2	2	3	4	6	5	7	4	2	3	3	7	1	–	2	77
20-24	6	1	4	1	4	4	4	2	4	2	6	5	2	2	8	5	4	5	11	4	5	9	9	2	109
15-19	1	–	6	5	3	1	5	5	2	2	4	5	5	2	4	4	3	7	7	9	6	8	6	7	107
10-14	4	3	5	2	3	4	5	4	4	3	6	7	8	10	4	3	5	8	6	5	10	7	7	6	129
5- 9	2	2	3	5	4	4	3	2	4	6	10	9	6	7	11	6	11	8	5	9	7	9	2	10	145
0- 4	–	2	1	1	2	5	4	1	4	3	3	2	5	4	2	4	4	8	1	3	3	3	5	2	72
TOTALS	16	14	28	20	29	28	31	30	36	26	40	50	44	34	48	42	44	55	50	54	52	52	38	46	907

@ Please leave these columns blank. NOTES.
$ Please leave these rows blank.

(1) Please enter in the "AGE" row official ages month by month, starting with the lowest month group, e.g., 10:6, 10:7, etc.
(2) The entry in each cell of the table should show the number of children of age at head of column who get test scores within the range shown on the left.

RAW SCORE DISTRIBUTION (SUPPLEMENTARY - S1) 176

Education Authority JAMAICA LSE/48 Test ARITHMETIC 1 Date of Test 4th SEPTEMBER 1948 Ages in years and completed months at 31st AUGUST 1948 Boys or Girls BOTH

Age at Test date	10:8	10:9	10:10	10:11	11:0	11:1	11:2	11:3	11:4	11:5	11:6	11:7	11:8	11:9	11:10	11:11	12:0	12:1	12:2	12:3	12:4	12:5	12:6	12:7	TOTALS
Score Age ↓ Official	11:0	11:1	11:2	11:3	11:4	11:5	11:6	11:7	11:8	11:9	11:10	11:11	12:0	12:1	12:2	12:3	12:4	12:5	12:6	12:7	12:8	12:9	12:10	12:11	
		@		@		@		@		@		@		@		@		@		@		@		@	
95-100	–	–	1	–	1	1	–	1	–	–	2	1	1	–	–	1	1	1	–	1	–	1	2	–	84
90-94	–	2	–	1	3	1	1	1	6	3	1	2	6	1	4	6	4	6	3	4	2	1	1	10	
85-89	3	1	4	1	5	2	2	5	3	4	3	6	4	1	7	6	4	6	2	7	5	3	2	6	165
80-84	1	–	–	2	1	–	1	3	3	–	3	4	5	3	5	6	3	4	7	5	4	8	3	2	
75-79	–	1	3	2	2	3	2	1	4	–	3	5	2	3	2	2	5	8	2	9	8	2	2	3	147
70-74	3	–	3	1	1	1	1	3	2	2	3	2	2	2	2	3	4	7	8	4	2	6	3	7	
65-69	–	2	2	–	1	2	2	3	3	1	1	3	1	1	3	3	5	2	3	5	1	4	1	1	111
60-64	1	1	2	–	1	3	3	1	2	3	3	5	1	2	3	1	4	3	5	–	3	2	5	2	
55-59	–	–	1	1	1	3	2	3	2	–	1	4	2	1	–	2	3	3	2	3	1	5	2	3	116
50-54	1	1	4	4	3	2	5	2	1	3	4	2	3	1	3	1	1	2	6	3	6	4	6	3	
45-49	1	–	5	2	–	2	1	3	3	2	3	4	6	4	7	3	2	2	5	4	2	4	1	1	119
40-44	1	1	–	1	2	1	2	–	2	1	3	2	–	4	2	–	2	–	4	2	5	4	2	1	
35-39	1	–	1	4	1	–	1	1	1	3	3	3	2	5	4	1	2	4	–	2	3	2	4	3	96
30-34	1	1	1	1	4	–	3	1	–	2	–	2	3	1	2	4	1	2	3	1	2	2	2	3	
25-29	1	2	1	–	1	1	2	1	1	–	2	4	2	3	2	1	1	–	–	2	1	2	–	–	63
20-24	1	1	–	–	2	1	2	1	–	1	2	1	4	1	1	–	1	1	–	2	2	–	1	1	
15-19	1	1	–	–	–	4	1	–	3	1	3	–	–	–	–	2	–	3	–	–	–	1	–	–	223
10-14	–	–	–	–	–	1	–	–	–	–	–	–	–	1	1	–	–	1	–	–	–	–	1	–	
5- 9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
0- 4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	
TOTALS	16	14	28	20	29	28	31	30	36	26	40	50	44	34	48	42	44	55	50	54	52	52	38	46	907

@ Please leave these columns blank. NOTES.
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(1) Please enter in the "AGE" row official ages month by month, starting with the lowest month group, e.g., 10:6, 10:7, etc.
(2) The entry in each cell of the table should show the number of children of age at head of column who get test scores within the range shown on the left.

RAW SCORE DISTRIBUTION (ARITHMETIC -A1) 177

TABLE 43. CONVERSION TABLES, ENGLISH 2, RAW SCORE 0-50

0 – 50

CONVERSION TABLE E2

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	
10	92	96	98	100	102	104	106	107	108	109	110	111	111	112	113	113	114	114	115	115	116	116	117	117	118	118	118	118	119	119	120	120	120	121	121	121	122	122	122	122	123	123	123	123	124	124	124	124	125	125	125	11:0
11:1	92	95	98	100	102	103	105	106	108	109	109	110	111	112	112	113	113	114	114	115	115	116	116	117	117	117	118	118	118	119	119	119	120	120	120	121	121	121	122	122	122	122	123	123	123	123	124	124	124	124	125	1
11:2	91	95	97	99	101	103	104	106	107	108	109	110	110	111	112	112	113	113	114	114	115	115	116	116	117	117	117	118	118	118	118	119	119	119	120	120	120	121	121	121	122	122	122	123	123	123	123	124	124	124	124	2
11:3	91	94	96	99	101	102	104	105	106	107	108	109	110	110	111	112	112	113	113	114	114	115	115	115	116	116	117	117	117	118	118	118	119	119	120	120	120	120	121	121	121	121	122	122	122	122	123	123	123	123	124	3
11:4	90	93	96	98	100	102	103	105	106	107	108	109	109	110	111	111	112	112	113	113	114	114	115	115	115	116	116	116	117	117	117	118	118	118	119	119	119	119	120	120	120	121	121	121	122	122	122	122	123	123	123	4
11:5	90	93	95	98	100	101	103	104	105	106	107	108	109	109	110	111	111	112	112	113	113	114	114	114	115	115	116	116	116	117	117	117	118	118	118	119	119	119	119	120	120	120	120	121	121	121	121	122	122	122	122	5
11:6	89	92	95	97	99	101	102	104	105	106	107	107	108	109	109	110	111	111	112	112	113	113	113	114	114	115	115	115	116	116	116	117	117	117	118	118	118	119	119	119	119	120	120	120	120	121	121	121	121	122	122	6
11:7	89	92	94	96	98	100	102	103	104	105	106	107	108	108	109	109	110	111	111	112	112	112	113	113	114	114	114	115	115	115	116	116	116	117	117	117	118	118	118	119	119	119	119	120	120	120	120	121	121	121	121	7
11:8	88	91	94	96	98	99	101	103	104	105	106	106	107	108	108	109	109	110	111	111	111	112	112	113	113	114	114	114	115	115	115	116	116	116	117	117	117	118	118	118	118	119	119	119	119	120	120	120	120	121	121	8
11:9	87	91	93	95	97	99	101	102	103	104	105	106	107	107	108	108	109	109	110	110	111	111	112	112	113	113	113	114	114	114	115	115	115	116	116	116	117	117	117	117	118	118	118	119	119	119	119	120	120	120	120	9
11:10	87	90	93	95	97	99	100	101	103	104	105	105	106	107	107	108	108	109	109	110	110	111	111	112	112	112	113	113	113	114	114	114	115	115	115	116	116	116	117	117	117	117	118	118	118	118	119	119	119	119	120	10
11:11	86	90	92	94	96	98	99	101	102	103	104	105	105	106	107	107	108	108	109	109	110	110	111	111	112	112	112	113	113	113	114	114	114	115	115	115	116	116	116	117	117	117	117	118	118	118	118	119	119	119	119	11
12:0	86	89	92	94	96	97	99	100	102	103	103	104	105	106	106	107	107	108	108	109	109	110	110	111	111	111	112	112	112	113	113	115	114	114	114	115	115	115	116	116	116	116	117	117	117	117	118	118	118	118	119	12
12:1	85	89	91	93	95	97	98	100	101	102	103	104	104	105	106	106	107	107	108	108	109	109	110	110	110	111	111	111	112	112	112	113	113	113	114	114	114	115	115	115	116	116	116	117	117	117	117	118	118	118	118	13
12:2	85	88	90	93	95	96	98	99	100	101	102	103	104	104	105	106	106	107	107	108	108	109	109	109	110	110	111	111	111	112	112	113	113	113	114	114	114	115	115	116	115	115	116	116	116	116	117	117	117	117	118	14
12:3	84	87	90	92	94	96	97	99	100	101	102	103	103	104	105	105	106	106	107	107	108	108	109	109	110	110	110	111	111	111	112	112	112	113	113	113	114	114	114	114	115	115	115	116	116	116	116	117	117	117	117	15
12:4	84	87	89	92	94	95	97	98	99	100	101	102	103	103	104	105	105	106	106	107	107	108	108	108	109	109	110	110	110	111	111	111	112	112	112	113	113	113	114	114	114	114	115	115	115	115	116	116	116	116	116	16
12:5	83	86	89	91	93	95	96	98	99	100	101	101	102	103	103	104	105	105	106	106	107	107	107	108	108	109	109	109	110	110	110	111	111	111	112	112	112	113	113	113	113	114	114	114	114	115	115	115	115	116	116	17
12:6	83	86	88	90	92	94	96	97	98	99	100	101	102	102	103	103	104	105	105	106	106	106	107	107	108	108	108	109	109	109	110	110	110	111	111	111	112	112	112	113	113	113	114	114	114	114	115	115	115	115	115	18
12:7	82	85	88	90	92	93	95	97	98	99	100	100	101	102	102	103	103	104	105	105	105	106	106	107	107	108	108	108	109	109	109	110	110	110	111	111	111	112	112	112	113	113	113	113	114	114	114	114	115	115	115	19
12:8	81	85	87	89	91	93	95	96	97	98	99	100	101	101	102	102	103	103	104	104	105	105	106	106	107	107	107	108	108	108	109	109	110	110	110	111	111	111	111	112	112	112	113	113	113	113	114	114	114	114	114	20
12:9	81	84	87	89	91	92	94	95	97	98	99	99	100	101	101	102	102	103	103	104	104	105	105	106	106	106	107	107	107	108	108	108	109	109	109	110	110	110	111	111	111	111	112	112	112	113	113	113	113	114	114	21
12:10	80	84	86	88	90	92	93	95	96	97	98	99	99	100	101	101	102	102	103	103	104	104	105	105	106	106	106	107	107	107	108	108	108	109	109	109	110	110	110	111	111	111	111	112	112	112	113	113	113	113	113	22
12:11	80	83	86	88	90	91	93	94	96	97	97	98	99	100	100	101	101	102	102	103	103	104	104	105	105	105	106	106	106	107	107	107	108	108	108	109	109	109	110	110	110	111	111	111	111	112	112	112	112	113	113	23
13:0	79	83	85	87	89	91	92	94	95	96	97	98	98	99	100	100	101	101	102	102	103	103	104	104	104	105	105	105	106	106	106	107	107	107	108	108	108	109	109	109	110	110	110	110	111	111	111	111	112	112	112	24
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	0-50

APPENDIX 7

ADULT TEST NORMS

TABLE 44. SHOWING MEAN SCORES IN 'ERU' ADULT TESTS

Group	Age range	Mean Age	N	AV	AN	MHT	Mx
Undergraduates	18:2-28:0	22:0	29	42.5	41.2	61.2	
Training Coll.							
a. Men 1st att.	18:1-30:3	21:11	25	27.2	25.7@	31.4	
b. Men 2nd att.	-do-	-do-		33.4	31.4		
c. Women	17:3-27:10	21:3	94	25.3	27.6		
Training Coll. Candidates							
a. Men	16:7-34:2	20:1	118	22.6	21.6@		
b. Women	16:11-29:5$	20:5$	388	22.3	23.4		
c. Women-1949ø			169	20.5	21.9		
Teachers' Summer School			46	29.7			
Sec.Schools							
a.Boys VIth F.	15:4-19:7	17:4	24	34.4	37.3	43.0	43.8
b.Girls VIth F.	15:2-18:3	16:6	36	34.1	35.6	37.2	48.1
School of Agriculture	17:1-27:2	21:1	64	21.6	25.5		
Agricultural Schol.Cands.	15:5-17:0	16:1	4	14.0	21.5		

Explanation:

@ - These entries not strictly comparable as test subsequently revised slightly.

$ - Age range and mean age refer only to those of the candidates for whom data was available.

ø - First occasion on which ERU Adult tests used in Women's T.C. Entrance Exam. In later examinations many candidates had had previous attempt.

N - Number of Students

AV- 'ERU' Adult Verbal Test

AN- 'ERU' Adult Non-Verbal Test

MHT Moray House Adult Test 2

Mx Progressive Matrices

1st att., 2nd att. - 1st and 2nd attempts to show practice effect. See also ø above.

Blank spaces in the age columns indicate that data not available
Blank spaces in last four columns indicate that these tests were not taken by group concerned.

APPENDIX 8

LOCAL SCHOLARSHIP EXAMINATION (1948)

GENERAL KNOWLEDGE AND ESSAY PAPERS

EDUCATION DEPARTMENT

JAMAICA

LOCAL SCHOLARSHIP EXAMINATION

1948

ENGLISH COMPOSITION (ESSAY)

Time allowed - 20 minutes

Write an essay on ONE of the following subjects:-

(a) Cricket.

(b) The town or village in which you live.

(c) A "picture" that you enjoyed seeing at the "Movies".

(d) Your favourite game at School.

(e) John Canoe.

(f) Empire Day.

(g) The happiest day that you can remember.

(h) Why I should like to be a Guide or Boy Scout.

1. What instrument does a doctor use to get a picture of the bones in your body? 1.....

2. Name those important elements present in some foods which protect the body from particular diseases. 2.....

3. Scientists have found out recently how to obtain a tremendous amount of energy from a small quantity of matter. What is such energy called? 3.....

4. What continent would you reach if 4.....
(a) you flew south from Jamaica?
(b) you flew east from Jamaica? 4.....

5. When it is spring in Canada what season is it in New Zealand? 5.....

6. What instrument do we use to show the direction of the wind? 6.....

7. What is the chief grain food of the hot-lands? 7.....

8. Finish this statement: "An electoral franchise gives people to right to.....". 8.....

9a.....

9. Name the three branches of the Jamaica Legislature. 9b.....

9c.....

10. What is the meaning of "M.H.R."? 10.....

11. When our Government collects as much money as it spends, it is said to "balance its.....". 11.....

12. Who was told by God to leave his country, his kindred and his father's house and go to live in a strange land? 12.....

13. Who said: "The Lord is my shepherd, I shall not want"? 13.....

14a. What man in the Bible persecuted Christ first and then became an ardent disciple? 14a.....

14b. What man in the Bible followed Christ first and then betrayed him? 14b.....

15. Name the first Christian martyr. 15.....

16. What famous general landed in Britain in 55 B.C.? 16.....

17. For how many years has Jamaica been a British colony? 17.....

18. Name the nurse who was known as "The Lady with the Lamp". 18.....

19. Write down the title of one of Shakespeare's tragedies. 19.....

20. Give the name of the author of "From War to War". 20.....

GO ON TO PAGE 2. DO NOT WAIT TO BE TOLD.

21. Finish this statement in not more than six words: "The Montego Bay Conference studied plans for a .....". 21.....

22. What is the meaning of U.N.O.? 22.....

23. Name the famous national leader, called "Great Soul" by his people, who was assassinated early this year. 23.....

24. What is the present controlled price of beef (a) inside OR (b) outside the Corporate Area? 24a.....
OR
24b.....

25. What is the equivalent of XIX (Roman numerals) in ordinary numerals? 25.....

26. How many cricket pitches placed end to end would extend one mile? 26.....

27. What language other than English is spoken by over three million people in eastern Canada? 27.....

28. Name the country whose inhabitants are called the "Dutch". 28.....

29. What event do we commemorate in Jamaica on the 20th of November? 29.....

30. Give the name of the residence of the Governor of Jamaica. 30.....

31a. What mineral ore has been found in large quantities in Jamaica? 31a.....

31b. What metal is extracted from it? 31b.....

32. What vegetable is grown at Bull Savannah in the parish of St. Elizabeth mainly for export or for canning? 32.....

33. "4H" in the name "4H Club" refers to four words beginning with H. What are the words? 33.....

34a. Name a common liquid which can be changed into a solid or a gas. 34a.....

34b. It is changed into a gas by ....ing. 34b.....

34c. It is changed into a solid by f....ing. 34c.....

35. Name two airports in Jamaica. 35a.....
35b.....

36. Who is the leader of the majority party in the House of Representatives? 36.....

37. What is the meaning of "J.A.S."? 37.....

38. The damage done to certain plantations in the hurricane of 1944 led to a temporary shortage of soap in Jamaica. What kind of plantations were these? 38.....

39. Name the country which buys citrus fruits from Jamaica and sells butter to Jamaica. 39.....

LOOK OVER YOUR WORK TILL TIME IS UP

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1 Annual Reports of the Education Department, Jamaica.

2 Annual Reports of the Jamaica Schools Commission.

3 Annual Reports of Medical Services in Jamaica.

4 Annual Reports of the Registrar General, Jamaica.

5 Annual Reports of the Caribbean Commission Research Council.

6 Report of the Committee Appointed to Enquire into the System of Secondary Education in Jamaica (Kandel Report).

7 A Plan for Post-Primary Education being the Report of the Secondary Education Continuation Committee.

8 "The Torch" being the periodical magazine published by the Education Department, Jamaica.

9 Census of Jamaica, 1943.

10 Colonial Office List; section on Jamaica.

11 Handbook of Jamaica.